Vol. 22 No. 3 Whole No. 146

Domestic Engineering

CHICAGO NEW YORK PHILADELPHIA BOSTON

Dec. 15, 1901

NEW YORK, BOSTON, MINNEAPOLIS, DENVER, PHILADELPHIA, ST. LOUIS, LONDON, HAMBURG

AMERICAN RADIATOR CO. GENERAL OFFICES LAKE & DEARBORN STS. CHICAGO.

CROSBY STEAM GAGE AND VALVE CO. Boston. New York. Chicago

CROSBY LEAK-PROOF SPRING-SEAT GLOBE and ANGLE VALVES All Parts Interchangeable All Parts Renewable Tested for Highest Pressure

A Fact!

we wish to emphasize. You can buy of us with your eyes shut and not go wrong. Our GROUND KEY, FULLER, and COMPRESSION WORK is the best that is made. Get our Catalogue.

Glauber Brass Mfg. Co.
CLEVELAND, OHIO

PATTERNS
GOBEILLE PATTERN CO. Cleveland, O.

BUFFALO FANS

Heating
Ventilating
Drying
Mechanical Draft, Etc.

BUFFALO FORGE CO., BUFFALO, N.Y.

The Pattern Shop of the East
H. B. OLMSTEAD CO.
87 FRANKFORT ST NEW YORK

F. E. Cudell's PATENT sewer gas and back-water **trap**

for wash bowls, sinks, bath and wash tubs

Put into the White House by the U. S. government. For venting use vent trap.

CLEVELAND, OHIO

WATER BIG SUPPLY VOLUME **LIFTS**
L. E. RHODES CO. HARTFORD, CT.

See our Advertisement...Page 151

WHAT A DIFFERENCE

In the quality of Plumbing work.

RAYMOND'S

COMBINATION FERRULES MAKE RELIABLE CONNECTIONS BETWEEN LEAD AND IRON PIPES.

WHY?

Because they have an extra thickness of lead over the shoulder, giving strength where it is needed, and where other Lead Ferrules are weak.

The genuine article bears our label.

RAYMOND LEAD COMPANY, CHICAGO.

—JENKINS' '96 PACKING—

Pronounced by steam users throughout the world the best joint packing manufactured. Expensive? Not at all, as it weighs 30 per cent less than many other packings, consequently is much cheaper.

JENKINS BROTHERS, New York, Philadelphia, Chicago, Boston.

Constructed under the Jewell Warren Continental & Hyatt Patents

GRAVITY AND PRESSURE FILTERS
WRITE FOR CATALOGUE

New York Continental Jewell Filtration Company

40-42 W. Quincy St., CHICAGO. 15 Broad St., NEW YORK.

SEE ADV. ON PAGE XVI

Paragon Boiler

ISAAC A. SHEPPARD & CO.. - PHILADELPHIA

FRINK REFLECTORS

Awarded Silver Medal, Pan-American Exposition, Buffalo, 1901.

I. P. FRINK, 551 Pearl ST., NEW YORK

Mantle Chemicals

The Roessler & Hasslacher Chemical Co.
Office: 100 William St., New York.
Chicago Office: 16 N. Clark Street.

FOR 25 YEARS The World Has Known the Excellence of Crosby Steam Appliances. None so Efficient and Durable. Design and Workmanship Unrivalled **CROSBY** STEAM GAGE & VALVE CO. BOSTON. NEW YORK. CHICAGO.

IF YOU LOVE YOUR WIFE.

Get her a "*Search Light Vapor Lamp* for a *Christmas present.*" The best light for Homes, Stores, Streets. Catalog gladly sent.

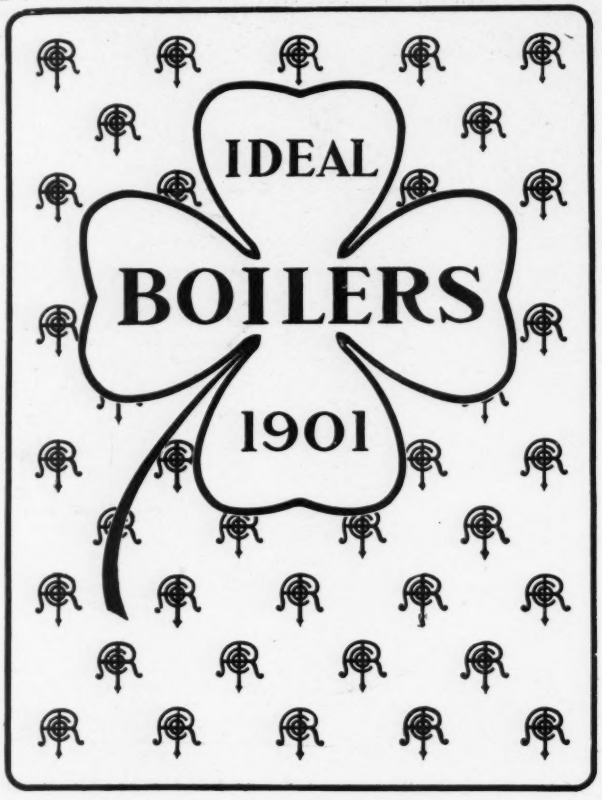
SEARCH LIGHT MANUFACTURING CO.
180 DIVISION STREET CHICAGO, ILL.

1902

Directory of Jobbers and Manufacturers of Plumbing, Heating, Lighting, Engine, Mining and Mill Supplies, will be ready in January.

Price $5.00.

Domestic Engineering, Chicago.



Our New Boiler Catalogue is Now Ready

A postal card request from you will bring a copy.

AMERICAN RADIATOR COMPANY

Lake and Dearborn Streets

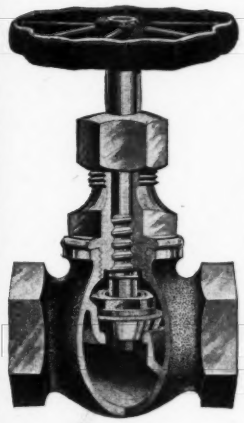
CHICAGO

NEW YORK
BUFFALO
MINNEAPOLIS

PHILADELPHIA
ST. LOUIS
DENVER

CRANE VALVES

BRASS



No. 1

CRANE STANDARD BRASS VALVES

are suitable for steam pressures up to 100 lbs., and are noted for their UNIFORM EXCELLENCE in design and construction.

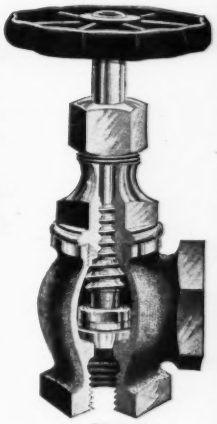
Made in globe, angle, gate, cross, check, etc., patterns, in sizes which should meet all requirements.

We are the largest makers of valves in the world and carry the largest stock, enabling us to fill orders promptly.

CLOSE COMPARISON
will surely induce you to
USE CRANE VALVES.

WRITE FOR POCKET CATALOGUE

ANGLE



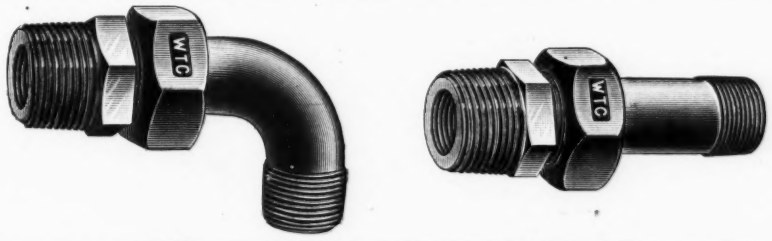
No. 2

NEW YORK
PHILADELPHIA
CINCINNATI
KANSAS CITY
SIOUX CITY
OMAHA

CRANE CO.
CHICAGO

ESTABLISHED 1855

ST. PAUL
ST. LOUIS
LOS ANGELES
SAN FRANCISCO
PORTLAND, ORE.



The "Kewanee" Boiler Coupling

BRASS and Iron Ball Joint Coupling. The coupling is brass, the ring and bottom piece malleable iron galvanized.

A coupling having all the advantages of a connection requiring no gasket to make a tight seal—besides a screw joint of different metals, thereby non-corrosive. The feature of an iron ring screwed to brass makes it possible to disconnect without injury to the ring.

WESTERN TUBE COMPANY
KEWANEE, ILL.

WALLACE L. PIERCE, PRESIDENT
GEO. B. LITTLE, VICE-PRESIDENT

OSBORN B. HALL
GEN'L MANAGER MECHANICAL DEPT.

GEO. T. COPPINS, SECRETARY
GEO. H. GRAVES, TREASURER

Walworth Manufacturing Co.

TOOLS AND SUPPLIES

FOR STEAM, WATER AND GAS USERS

ESTABLISHED
1842

INCORPORATED
1872

128 TO 136 FEDERAL STREET
BOSTON, MASS., U. S. A.

NEW YORK OFFICE, PARK ROW BLDG.
FACTORY, SOUTH BOSTON

WE CHALLENGE

Comparison of the

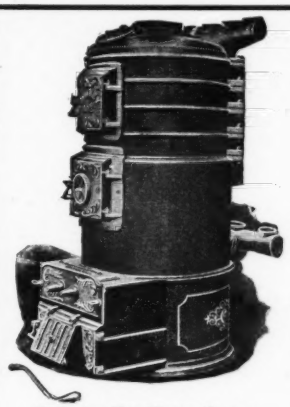
HENDERSON
THERMO HEATER

in all details of construction, with any other Heater made.

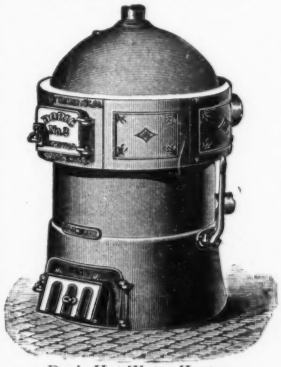
THE PRIZER-PAINTER STOVE AND HEATER CO.

READING, PA.

34 NORTH CANAL ST. CHICAGO
284 AND 286 PEARL ST. NEW YORK
215 FRANKLIN ST. BOSTON
380 CAMPBELL AVE, DETROIT
19 GILFILLAN BLOCK ST. PAUL



400 Series Hot Water Heater.



Doric Hot Water Heater.

EVERY EFFORT COUNTS

If you expect to be successful you must expend your effort on a worthy object. It is useless to attempt to sell more heaters if those you've already placed fail to fulfill expectations. For such effort is wasted effort.

There is, however, a decidedly better way, namely, to push

"GURNEY"

...HEATERS...

For then you're handling a heater worthy of your best efforts. The "Gurney" Heater will do everything we claim for it, for the simple reason that we have constructed it so that it should attain just that end.

Naturally, it's profitable to handle, not only because each sale affords a satisfactory margin, but more so because each "Gurney" placed is the spokesman for several other sales.

We're always on the lookout for energetic agents, for dealers who are anxious to make more money than they are now making. Does that mean you? Then write us. Latest trade catalogue on request.

Gurney Heater Mfg. Co.

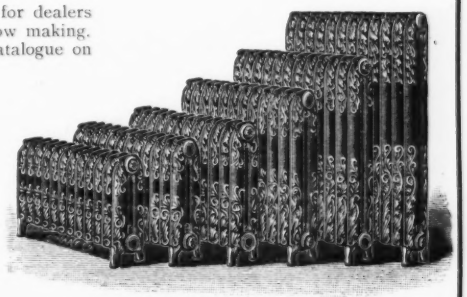
74 Franklin Street, Boston.

111 Fifth Ave., New York.

WESTERN SELLING AGENTS,

Jas. B. Clow & Sons, 222 to 224 Lake Street, Chicago, Ill.

Bright Idea Steam Boiler.



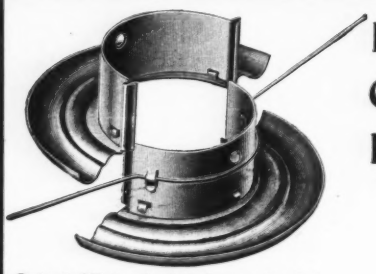
Duet Radiators for Hot Water and for Steam.

FOR PURE WATER

Avoiding, without extra expense, all danger of lead or brass poisoning. The lining cannot be separated from the pipe, even by bending or hot water : : : : : : : :

Also Lead-lined Iron Pipe made the same way.

LAMB & RITCHIE, CAMBRIDGEPORT, MASS.



Patented Nov. 3d, 1896, June 14th, 1898

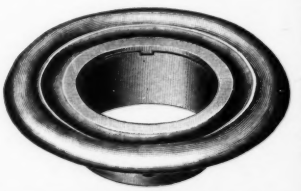
H. B. Perfection Ceiling Plate

Never Falls Down

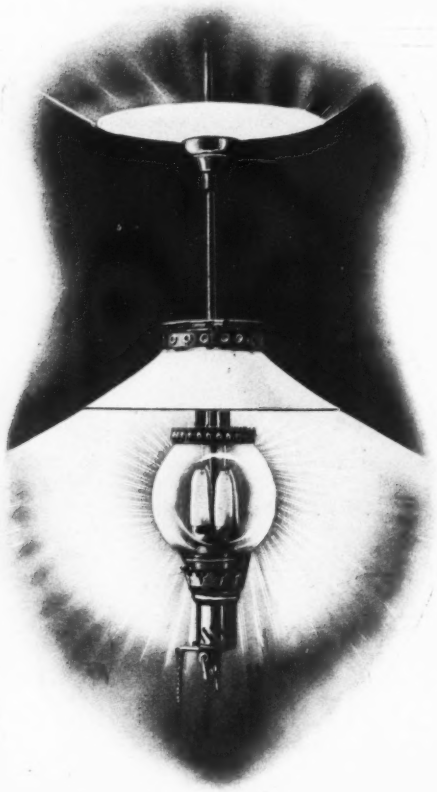
Other plates are very good plates, but the H. B. Plates are better. They snap up and stay up. Don't forget, They snap up against the ceiling instead of on the pipe.

HOUGHTON & BUXTON MANUFACTURING COMPANY
WORCESTER, MASS.

H. B. Perfection Floor Plate



Holds The Drip



DOORENBOS
ARC GAS LAMP

IS THE BEST

SCIENTIFIC.—The gas being heated to a temperature of over 1,000 degrees makes perfect combustion. One of these Arc Gas Lamps will give more light, of a better and steadier quality than twenty ordinary gas tips, with one-tenth the gas.

BIG LIGHT WITH LITTLE GAS

No Broken Globes or Shades.

Long Lived Mantles.

Gives a Gas Light that is superior to Electric Light at a trifle of the cost.

The Best Selling Gas Lamp on the Market.

Handsome,
Durable,
Low Price.

Write for our Prices and Terms to Agents.

Sanitary Specialty Mfg. Company

H. VERBEEK, President and Mgr. J. H. BROUWER, Sec'y.

24-32 Milwaukee Ave., CHICAGO 55-59 N. Clinton Street

OUR COMBINATION HAND AND POWER PIPE THREADING AND CUTTING MACHINE

Is the greatest pipe machine you ever saw. It is made in four sizes, to thread and cut off pipe 1 to 4 inches, 1 to 6 inches, 2⅛ to 8 inches, and 4 to 12 inches

The vice is self-centering, actuated by rack and pinion to feed the pipe into the chasers. You furnish the power and the chasers do the rest.

This machine is mounted on a base for use either by hand or power at will. But if yon want to take it out on a job it may be readily removed from its base and used as a portable hand machine.

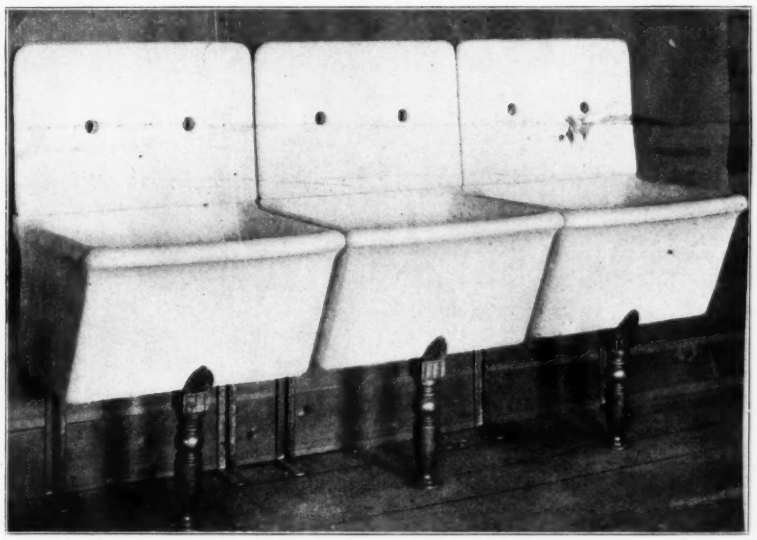
We want you to know more about our line of pipe machines. Catalogue No. 3 tells and its yours for the asking.

THE MERRELL MFG. CO. TOLEDO, O. U.S.A.

BURRELL & FOWLER CLEV'D O.

SOLID PORCELAIN LAUNDRY TUBS

Made by the AMERICAN PORCELAIN COMPANY New Brighton, Pa.



Made by the AMERICAN PORCELAIN COMPANY New Brighton, Pa.

Makers of the well known "Perfection" solid porcelain flat and roll-rim laundry tubs, kitchen and pantry sinks, lavatories, etc.

Per-fect-ed Du-plex No. 6

is an automatic steam air valve for radiators, which is guaranteed in the hands of the user for five years; by the guarantee we mean if from any fault of construction this valve does not give perfect satisfaction we will exchange it for a perfect valve at no further cost.

Beware of Imitation.

Has a special key "you will notice" for adjusting.
This will prevent an occupant of room from in any way tampering with the valve.
The air hole on the side of the screw prevents its being plugged up.
No flooding of floors and carpets.
No damage to ceilings below.
No cold or air-bound radiators.
The key is always in the possession of the engineer or janitor of the building, thus saving a great deal of annoyance and expense.
No other valve on the market as good.
Gives satisfaction always.
One million six hundred thousand valves in use on radiators.

Is at the top of the ladder—

is there to stay.

We have climbed the ladder of success during an uninterrupted progressive business career of ten years, which has placed us in the front rank and second to none in the manufacture of

Automatic Air Valves for Radiators

Monash-Younker Co.

CHICAGO
201-207 SO. CANAL STREET

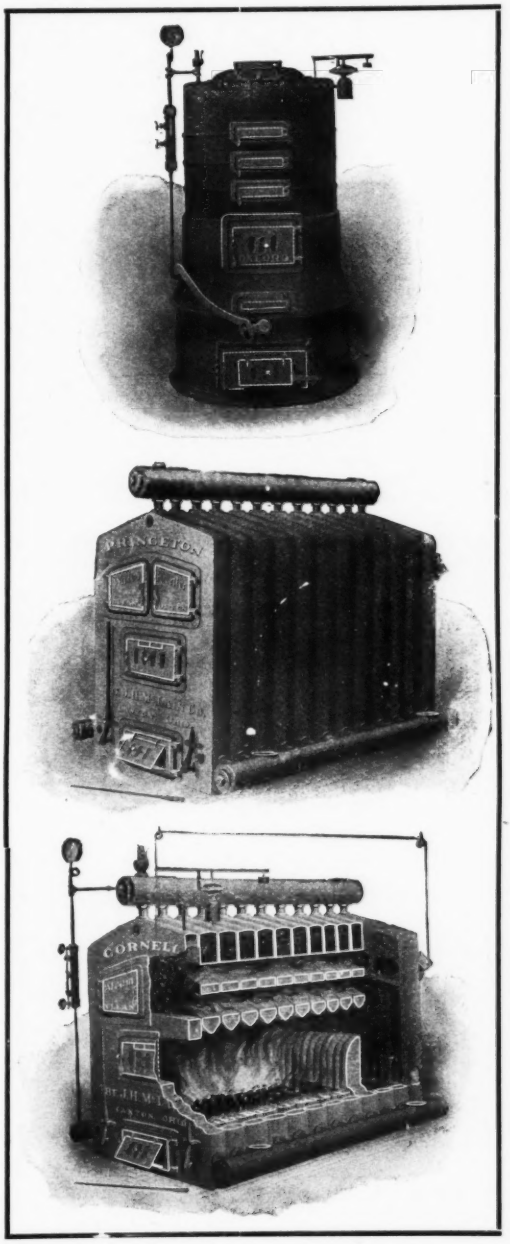
NEW YORK
43-45 CENTRE STREET

LONDON
59 CITY ROAD, E. S.

BERLIN
24 FREDRICK STRASSE

He Wanted a Good Heater

AND THIS IS WHAT HE GOT



Lock Haven, Pa., July 8th, 1901.

J. H. McLain Company,
Canton, Ohio.

GENTLEMEN:—

About three years ago, I placed one of your No. 28 Cornell Steam Boilers in a very large church, one of the largest in the city, and I think, without doubt, one of the very hardest to heat, It took the place of two boilers which were taken out. They used hard coal for heating at a cost of almost $150.00 a season. Your boiler is doing the same work, at a cost not exceeding $85.00 with soft coal, making a saving of at least $50.00 to $60.00 a year, and doing the work handsomely at that. To make a long story short, "IT'S A PEACH".

Yours truly
A. M. Thomas.

The Fruit Business and Bouquets are in Our Line.

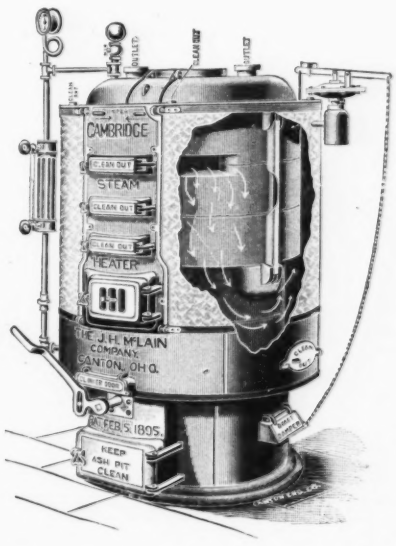
This shows you that a Boiler one-half as good as ours costs twice as much. We make the one kind,—the only kind you can afford to buy.

FOR STEAM
Gornell
Gambridge
Oxford

TRADE MARK.

FOR HOT WATER
Princeton
Humber
Amherst
Yale
Sandow

For every kind and condition of work.



THE J. H. McLAIN COMPANY

WORKS AND MAIN OFFICE, CANTON, OHIO

BRANCH OFFICES

NEW YORK CHICAGO PHILADELPHIA INDIANAPOLIS

The Number Twelve ACME

IS OUR LATEST

It is built on the Principle of the Old Reliable

Douglas Number 2

The "FATHER" of Instantaneous Water Heaters wherein the Products of Combustion of the Gas and the Water do NOT come in Contact.

List Price

$25

It is designed on new and artistic lines and contains a very large Heating Surface; it is fitted with our new

BURNER,
AUTOMATIC SAFETY LOCK
and WATER PRESSURE REGULATOR.

Features that will be appreciated by the trade. New catalogue on application to the makers of

The Largest and Most Perfect Line of Instantaneous Water Heaters on Earth.

The Instantaneous Water Heating Company

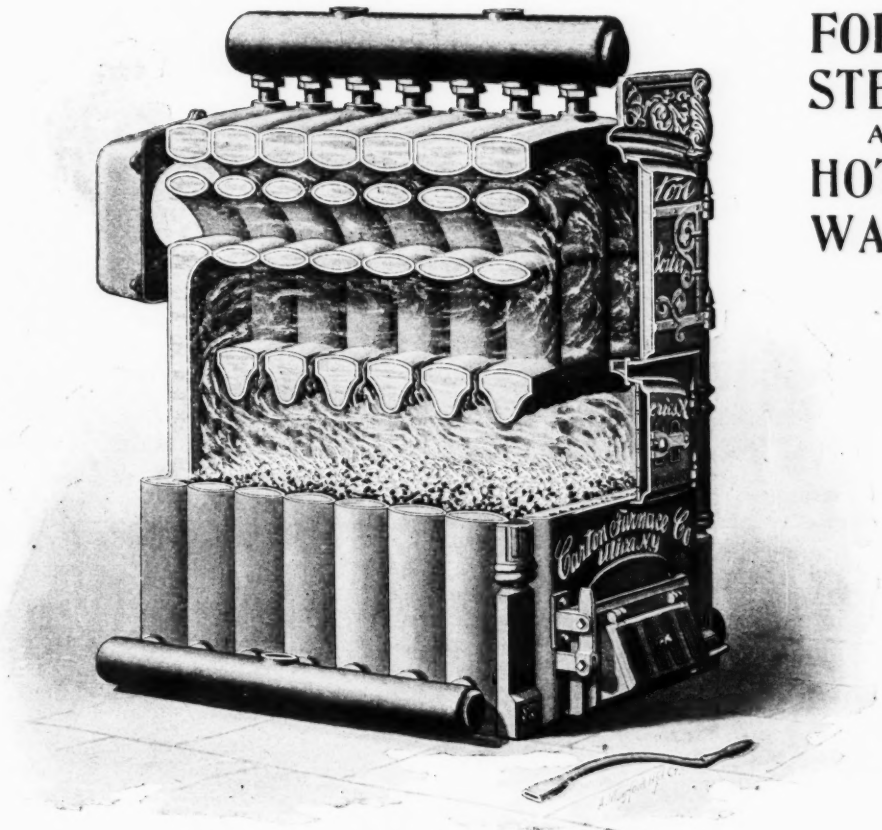
Ohio and Orleans Streets
CHICAGO

CIVILIZATION DIFFERS FROM SAVAGERY ONLY IN THE DEGREE MEN ARE ABLE TO MAKE NATURAL FORCES CONTRIBUTE TO THEIR COMFORT AND HAPPINESS. BE HIGHLY CIVILIZED. USE THE CARTON.

AWARDED
GOLD MEDAL
PARIS
1900

THE CARTON BOILERS

MAY BE DEPENDED UPON



FOR STEAM AND HOT WATER

75 PER CENT. FIRE SURFACE

Notice the crown sheet, and the course of the fire currents.
Not a Copy—or a Make-Shift—ORIGINAL—SCIENTIFIC—

INTERNATIONAL HEATER COMPANY

LARGEST MAKERS OF HEATERS IN THE WORLD

UTICA, N. Y.

BOSTON	NEW YORK	CHICAGO	DENVER
47 Union Street	237 Water Street	48 Dearborn Street	1759 Stout Street

GEM Hot Water and Steam BOILERS

EASILY AND QUICKLY SET UP
CAPACITY GUARANTEED

WE ALSO MAKE THE

ABENDROTH VERTICAL SECTIONAL STEAM AND WATER BOILERS

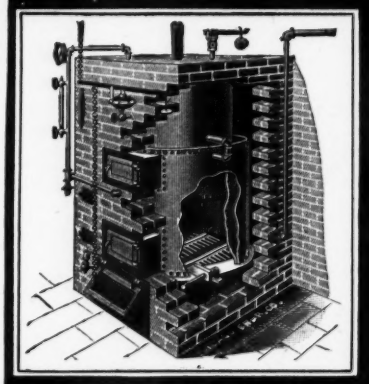
LONG AND FAVORABLY KNOWN TO THE TRADE EVERYWHERE

Write for Illustrated Catalogue

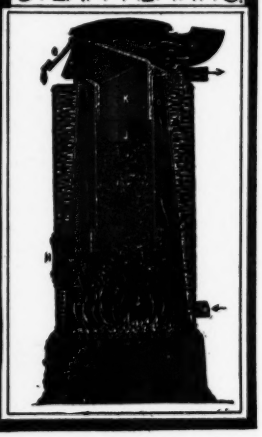
ABENDROTH BROS. 109-111 Beekman St., New York
114 High St., Boston, Mass.
Pt. Chester, W. Chester Co., N.Y.

AGENTS: Crane Co., Philadelphia, Pa. Western Valve Co., Chicago, Ill.

KEWANEE BOILER COMPANY
KEWANEE ILL.



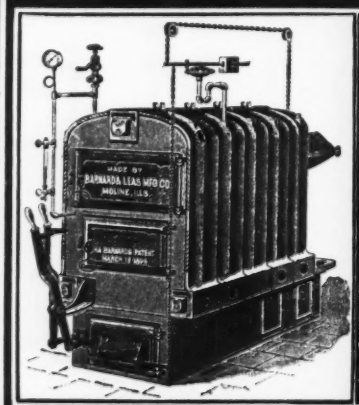
MANUFACTURERS OF
HAXTUN STEEL BOILERS FOR HOT WATER AND STEAM HEATING



"TABASCO" WATER HEATERS
ALL STEEL SELF FEEDERS

SEND FOR SPECIAL CATALOGUES
169 LAKE ST.
·CHICAGO·

BARNARD BOILERS BEST
Steam and Hot Water



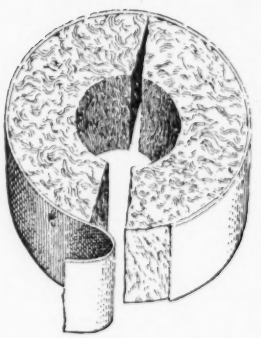
C. H. NORTON, of Marinette, Wis., says: I have purchased seventeen of your Barnard Boilers all told, and they are all giving the very best of satisfaction. I think I can truthfully say that we have some of the best and most economical working jobs in the country.

Barnard & Leas Mfg. Co.

NEW CATALOGUE—Write for it. Moline, Ill.

PIPE COVERINGS

For High and Low Pressure Steam



For Hot or Cold Water

Asbestos Paper and Millboard. Hair Felt by the square foot. Mineral Wood by the bag or ton. Block Covering by the square foot.

Write for Catalogue and Discounts.

Norristown Covering Company

NORRISTOWN, PA.

BREMEN

Our goods and prices will interest you—permit us to demonstrate this.

ECLIPSE

Holland Radiator Co.

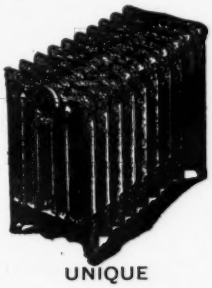
CHICAGO: 38 DEARBORN STREET
DENVER: 1759 STOUT STREET
WORKS: BREMEN, IND.

RELIANCE

Agents:

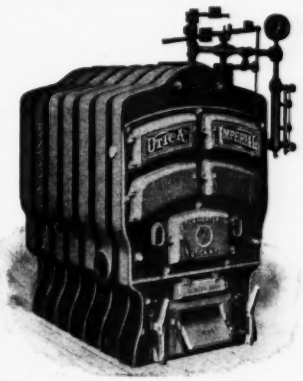
United States Water and Steam Supply Company, Kansas City

The George Worthington Company, Cleveland



UNIQUE

The "Imperial"



Has no Equal
Convenient to Install
Easily Operated
Economical in Fuel

New and desirable features never before employed.

Send for Circular and Terms to Agents

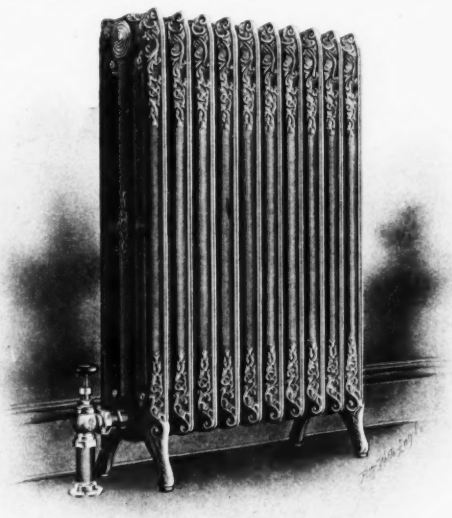
Sectional and Round Steam and Hot Water Boilers

FOR RESIDENCES AND PUBLIC BUILDINGS.

UTICA HEATER CO.

UTICA N. Y.

CHICAGO HEATER & SUPPLY CO., 54 DEARBORN ST., CHICAGO



Solus Radiators FOR WATER AND STEAM.

SOLUS SEMI-DIRECT RADIATORS
IMPERIAL WALL AND WINDOW RADIATORS

You will find a complete description of above line in our new catalogue. Write for a copy and ask us how soon we can fill your orders.

The Fowler Radiator & Mfg. Co.
JOHNSTOWN, PA.

THE "IMICO" HEATER

FOR STEAM OR WATER

The best type and the best of its type.

Properly proportioned. Easily set up. Perfect Circulation. Economical coal consumption.

Experienced fitters appreciate it.

Illinois Malleable Iron Co.

30 WEST MONROE ST., CHICAGO, ILL.

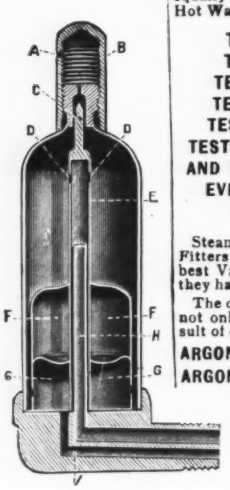
ALSO MANUFACTURERS OF

Eureka Combination Fittings, Perfection Floor Sleeves, Chicago Roller Hangers, Chicago Ceiling Plates, A B C Clamps. Write for Catalogues.

STANDS ALL TESTS

IN ORDER TO OBTAIN THE BEST RESULTS
IN RADIATION IT IS NECESSARY TO USE

The Argon Automatic Air Valve



INTERIOR VIEW.

It is the only one on the market equally efficient on both Steam and Hot Water Radiators.

TESTED FOR AIR
TESTED FOR GAS
TESTED FOR STEAM
TESTED FOR WATER
TESTED FOR SERVICE
TESTED FOR PERFECTION
AND NOT FOUND WANTING
EVERY ORDER BRINGS
ITS DUPLICATE

Steam Heaters, Contractors and Fitters are not acquainted with the best Valve on the market, unless they have tried the ARGON.

The decision of experts, evinced not only in opinion, but as the result of experience, is that the

ARGON VALVES DO THE WORK
ARGON VALVES ARE RELIABLE

Need
No Adjustment
Are
Guaranteed

EXTERIOR VIEW

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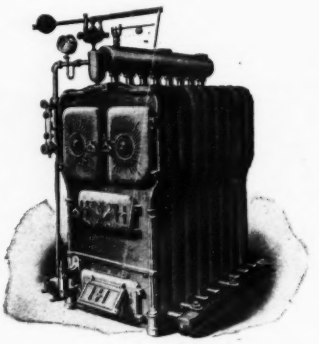
DENVER, COLORADO.

Established 1850

"Thatcher"
Steam and Hot Water Heaters



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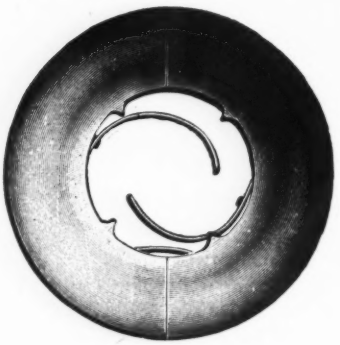

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WRITE US AND WE'LL TELL YOU WHY.

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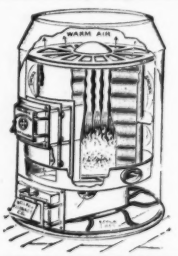
The Kelsey Warm Air Generator

Furnishes the purest quality of warm air and an abundance of it, to every part of the largest house.



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Because the Kelsey Method of warming the air by sending it in separate channels through the cast iron sections is more effective than by simply passing over or next to a hot surface.

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Turret Lathes and Screw Machines

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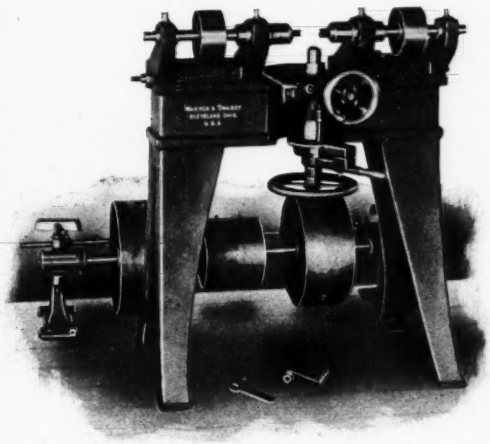

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For mil ing the square and hexagon parts of valves, nuts, etc.

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When you have a "Rush" Job on hand 'tis then the virtues of

ARMSTRONG'S
WATER, STEAM AND GAS FITTERS
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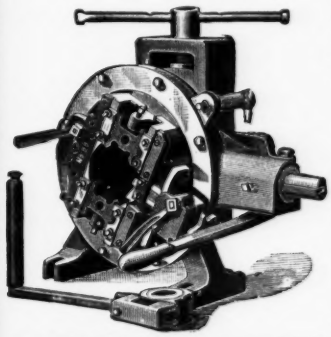
make themselves apparent.



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HAND or POWER
capacity from 1-4 in. to 6 in.

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At a smaller cost than any other light can be procured.

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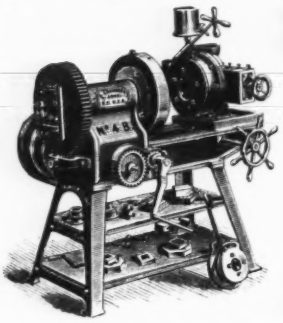

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One Wheel and Roller Cutter; Three Wheeled Cutter; Tool Cutter,

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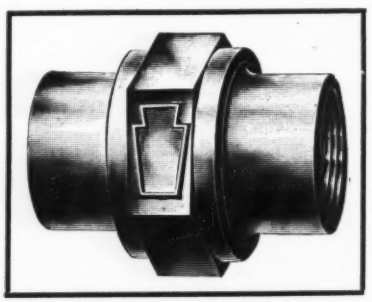

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SOFT METAL SEAT
Are Always Tight.

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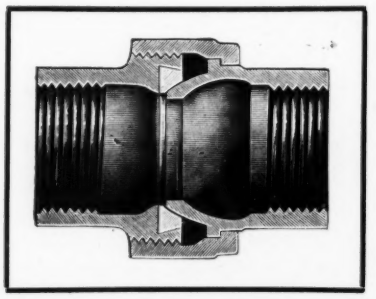

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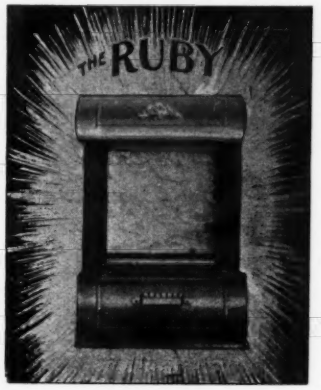

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We manufacture and job a complete line of Incandescent Gas Goods.
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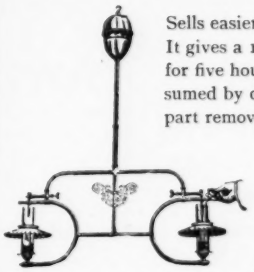

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We want reliable Plumbers as Agents

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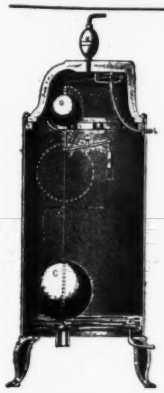

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For use wherever compressed air is required.
Used by Burrows Light Company and Koch Consumption Cure Co.
The most popular pump in Philadelphia for drawing beer.

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Specially designed for use on any pipe or shafting having a finished surface which you do not wish marred or disfigured.

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Releases Instantly.

Unsurpassed for Simplicity, Quickness of Adjustment and Strength of Grip.

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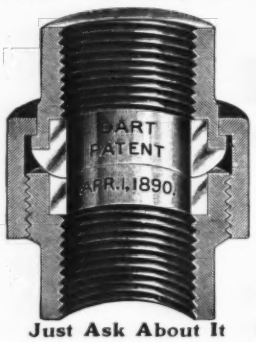

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It is not only the name but the Valve!

THE CHICAGO

This Steam Radiator Air and Water Valve is the only valve that has the four correct Mechanical Principles of Perfection.

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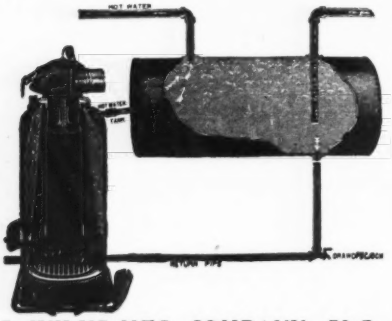

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All Steel.

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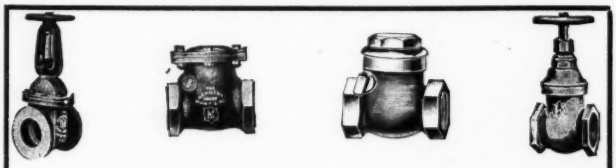

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Simple to use—Safe under pressure.

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Miller Cellar AND Back Water Trap

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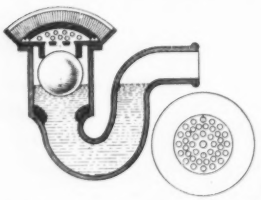

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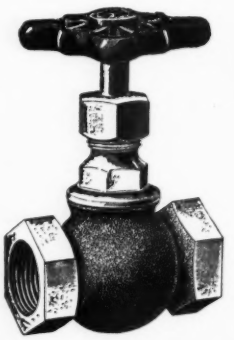

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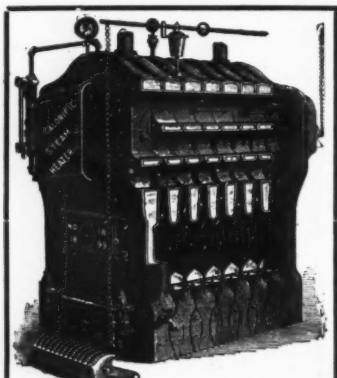

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COSTS LITTLE, YIELDS COMFORT

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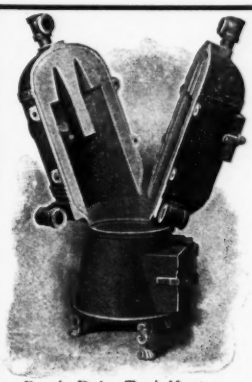

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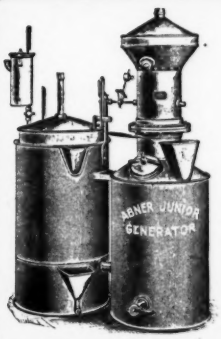

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ACETYLENE GENERATORS
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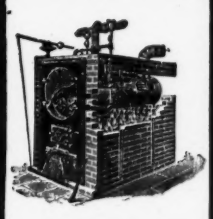

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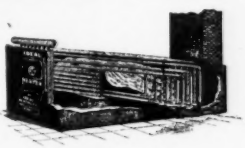

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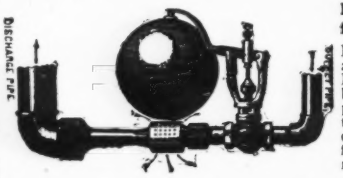
Operated by Water or Steam Pressure.



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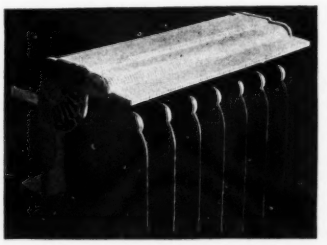

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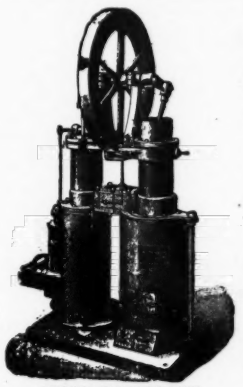
IMPROVED BATH-ROOM FIXTURES



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DENNEY IMPROVED RIDER & ERICSSON HOT AIR PUMPING ENGINES

The most Reliable and Economical Engines for pumping water. Use any kind of fuel. Can be operated by any one. Perfectly safe, Noiseless, and Always ready for service. Important Improvements Patented and NOT FOUND in any OTHER MAKE of engines. Send for catalogue and testimonial list.

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American Machine Co.
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PLUMBERS' CABINET WOOD WORK

Seats, Tanks, Drain Boards and Marine Lavatory Cases.

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Plumbing Supplies and Sanitary Specialties

50 AND 52 N. SEVENTH STREET
PHILADELPHIA

THE ONLY SANITARY WASTE

THE PURITY BATH & BASIN WASTES

cut off the water in the Bowl or Bath from direct contact with the FILTH IN THE OUTLET PIPES,

Opens or closes with a touch,
Simple in construction,
No parts to get out of order.

FOR FULL PARTICULARS ADDRESS

THE H. M. WEAVER CO.
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New York Office: No. 81 Fulton St.

SOMETHING NEW

Vanderman's Adjustable Fitting for Connecting Soil Pipe

Send for Catalogue and Price List of Plumbing and Heating Specialties, or order through your Jobber.

Freight allowed on the Adjustable Fittings, East of the Mississippi river, on a dozen of one or assorted sizes.

Sample Fitting will be Sent on Application.

MANUFACTURED AND FOR SALE BY

THE VANDERMAN PLUMBING AND HEATING COMPANY
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THE WILHELMI | THE MODERN

TWO BEST BOILERS

The "Wilhelmi" is a high-grade copper range boiler tested to 250 pounds and guaranteed to stand a working pressure of 150 pounds. There can be no better boiler made.

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BOTH BOILERS GUARANTEED NOT TO LEAK AND AGAINST COLLAPSE

Very attractive Discounts Furnished

For Sale only by Jobbers of Plumbers' Supplies

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YOU ARE NOT USING THE BEST OR SAFEST TANK UNLESS IT IS ONE OF OUR

CYPRESS TANKS

They outlast all other kinds, give better service and are therefore more economical. Any size and shape. It's up to you-ask us questions!

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Value for Dollars

IF we, as the manufacturers of the

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were paid in proportion to its value, the price would be many times higher than what we charge.

Many hundreds of buyers of the Webster Heaters have realized the return of anywhere from 15 to 75 per annum on their investments.

We issue a little book about the Webster Heater that ought to be convincing to any one who owns a steam plant.

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ALTPETER'S ALUMINUM SOLDER
Hard and Soft Solder, also a process to solder copper, brass and other metals to aluminum
Samples shown. No solder for sale
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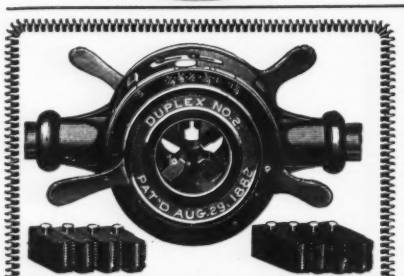

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DUPLEX ADJUSTABLE STOCKS and DIES should be in the hands of every PLUMBER AND PIPE FITTER. DO YOU OWN ONE? Let us mail you list and quote prices : : : : :

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HOUSE HEATERS
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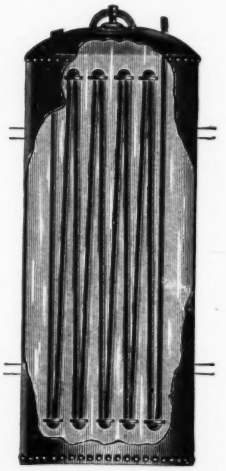

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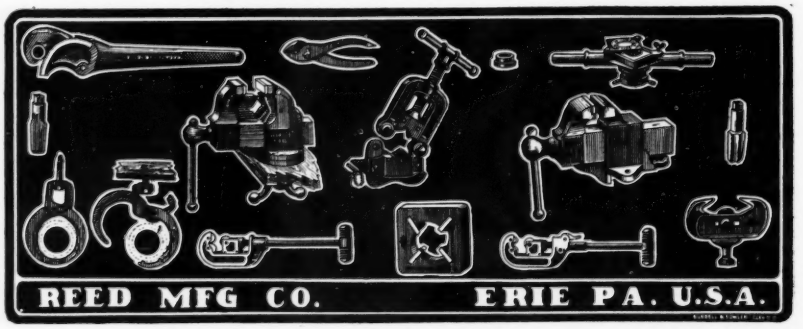

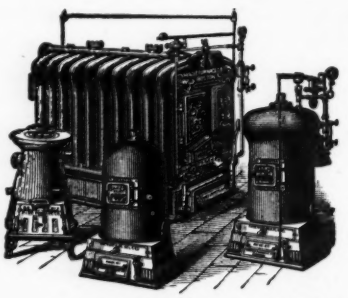

MAGEE STEAM AND HOT WATER **HEATERS**

GOLD MEDAL PARIS EXPOSITION HIGHEST AWARD

THE MOST COMPLETE LINE UNDER ONE NAME MADE IN THE UNITED STATES

OUR CAPACITIES RANGE IN
Square feet of Water Radiation 100 to 6,000
Square feet of Steam Radiation 200 to 3,600

Send for catalogue Correspondence solicited

MAGEE FURNACE CO., BOSTON, MASS.

YOU KNOW

How coal is wasted up a flue. We guarantee the "**ROBERTS**" to be the most economical and easily managed boiler on the market. Will not such a boiler get you further orders?

We also make the "**CHARMER**" for medium size work, and the "**MILTON**" for large buildings, both square boilers.

Philadelphia Office:
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Roberts Machine Company
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Planet Mills Mfg. Co.

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"TOTAL ECLIPSE"

Hydrants and Street Washers

The cheapest and most durable on the market.

Guaranteed to give entire satisfaction

We also make all styles of "McNAMARA" PATTERN HYDRANTS

Carried in stock by all Jobbers

WRITE YOUR DEALER FOR PRICES

JOHN G. KUPFERLE

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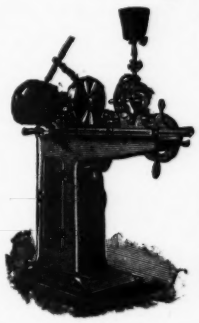
JARECKI MANUFACTURING CO., = Erie, Penn.

Erie Pipe Hangers

Erie Malleable Unions Copper P'ck'g

Always ready for instant use.



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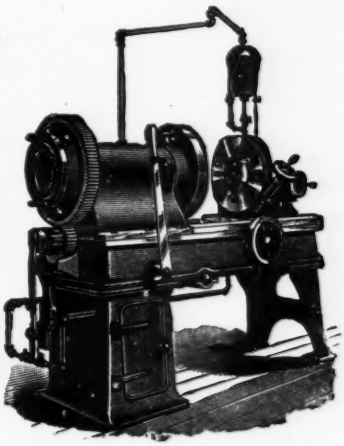
Drainage Fittings

Pipe Threading and Cutting Tools Write for catalogues showing the most complete line of ⅛-inch to 16 inches for Hand, Belt, Engine, and with Electric Motor Attachment. We can furnish Bolt-Threading Attachment for these machines.



DIXON'S GRAPHITE COMPOUND

Is infinitely better than red or white lead for making steam, gas or water pipe joints. Joints will be tighter, and can be broken months or years after without damage to pipes or tools. IT WILL PAY EVERY PIPEFITTER TO SEND FOR SAMPLE AND CIRCULAR.

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Lightning Automatic Valve

FOR USE WITH LAWSON'S GAS WATER HEATER

Automatically turns the gas on and off as required to keep the boiler full of hot water at all times. . . . .

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McVAY & WALKER

Manufacturers of Enameled Tubs.

WILL GLADLY SEND PRICES ON THE TWO BEST TUBS MADE.

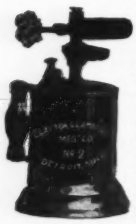
Write Today. Unique and Eureka Prices will surprise you.

BRADDOCK, PA.

"Let Well Alone", is a dangerous proverb for business men. You can increase Your Trade by advertising in

DOMESTIC ENGINEERING.

BANG! BOOM! YOW!



That's what Bridget said when the water pipe froze and the water front burst. If you are called to repair the damage, don't hurry, take your time; look up the old torch, or borrow one; struggle hard to get at least a look at the job before night. If you were ready and had an extra torch or two you might get as much work as that enterprising Jim Jones does. Jones buys Clayton & Lambert Mfg. Co.'s torches. He says "*They will give my money back if I don't like them.*" Yes, jobbers sell them at factory price, or if you send $3.00 to *Clayton & Lambert Mfg. Co. Detroit, Mich., U. S. A.*, they will send one by paid express. *Do it now. Don't wait till you're frozen.*

$2.50 NET.

Clayton & Lambert Mfg. Co., Detroit, Mich.

THE NULITE VAPOR GAS LAMPS

For Home, Store and Street.

The Nearest Approach to Sunlight and Almost as Cheap.

ARC ILLUMINATORS 750 CANDLE POWER. 7 HOURS TWO CENTS.

Make your stores light as day. A Hardware house writes us:

"We like your lamps so well we are now working nights instead of days."

We also manufacture **TABLE LAMPS, WALL LAMPS, CHANDELIERS, STREET LAMPS, Etc.** 100 Candle Power seven hours ONE CENT. No wicks. No Smoke. No Odor. Absolutely safe. **THEY SELL AT SIGHT.** Exclusive territory to good agents. ☞Write for catalogue and prices.

CHICAGO SOLAR LIGHT CO., Dept. 37, CHICAGO.

THE CELEBRATED

BOSS WASHER

TAKE NOTICE

No Boss Washers are Genuine that do not have the inventor's name "ANDREW BELL" on Label of box.

Samples sent by Mail

MADE ONLY BY

ANDREW BELL

375 MARKET ST., NEWARK, N. J.

The ACETOGEN.

Acetylene Apparatus

F. Cortez Wilson & Co., Chicago

GIVES PERFECT LIGHT

NAUGATUCK SEAMLESS COPPER BALL FLOATS

GUARANTEED FOR ONE YEAR

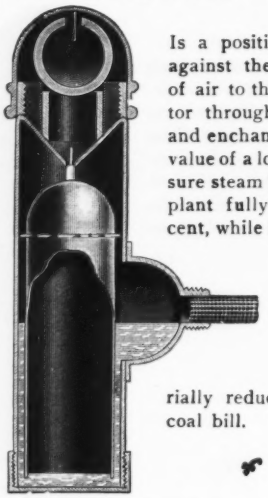
FOR RECEIVERS STEAM TRAPS REGULATORS ETC.

TESTED TO 300 LBS.

NAUGATUCK MFG CO. NAUGATUCK, CONN.

MORGAN'S

TWENTIETH CENTURY AIR AND VACUUM VALVE



Is a positive seal against the return of air to the radiator through itself, and enchances the value of a low pressure steam heating plant fully 50 per cent, while it materially reduces the coal bill.

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CHICAGO, ILLINOIS

TELEPHONE CALL 1515 CORTLANDT

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ESTIMATES FURNISHED AND CONTRACTS EXECUTED.

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SMOOTH-ON IRON CEMENT No. 1

TRADE MARK.

will repair leaky boilers, piping, etc., it will withstand fire, water, steam and oil, it expands and contracts the same as iron. Write for catalogues and prices.

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For Sale by Henion & Hubbell, 61-69 N. Jefferson St., Chicago, Illinois.

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no machine is better made or more perfectly meets every requirement than the OSTER PIPE THREADING MACHINE. For hand or power. Does its work easily, quickly and accurately.

SEND FOR PARTICULARS.

THE OSTER MFG. CO.
61 E. PROSPECT ST.
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A Natural Gas Safety Valve

This valve, if placed near the meter on a natural gas service pipe, will act as a safe guard and prevent the gas from escaping, should at any time the city pressure be turned off and on again. At the moment the gas is shut off from the city a piston operating automatically in the cylinder of the valve will drop immediately, thus preventing any escape of gas from the pipes into the house.

The Akron Gas Valve Co.
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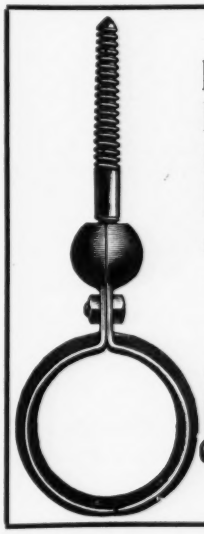

Hanna Ball Joint Pipe Hanger

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Made of Malleable Iron. All ways the best. Carried in stock and for sale by all ::::::: Supply Houses

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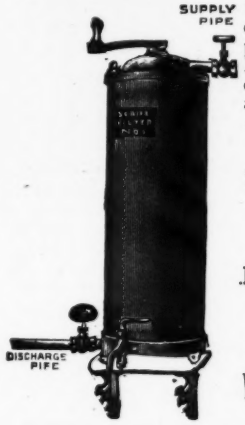

Eminent chemists testify that our Water Filters are germ proof. No chemicals used; Filters can be thoroughly cleansed without removing any part.....
....Results guaranteed....

CAPACITY 10 to 10,000 gals. per hr.

Hundreds of our customers have furnished voluntary testimonials.

LIBERAL DISCOUNTS TO PLUMBERS.

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WM. B. SCAIFE & SONS,
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WORDS OF WISDOM

"Do not advertise and stop,
But advertise and stay,
For those who read your ad last week
Will look for it to-day."

WE PUBLISH 6 EDITIONS:

Our great monthly of international circulation.
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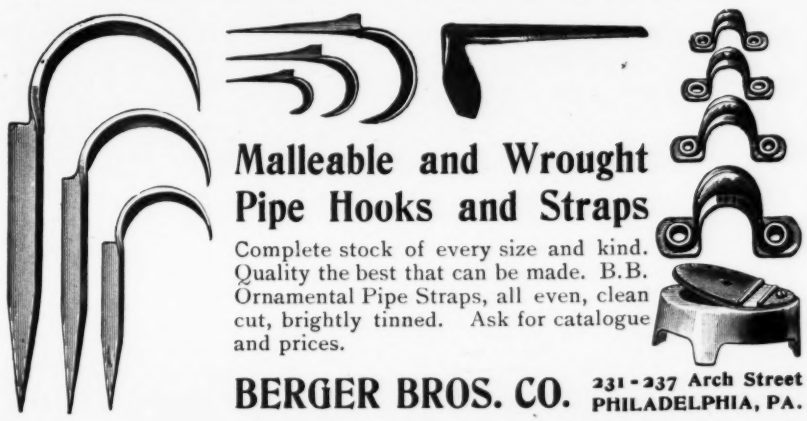
THESE COVER THE FIELD, DO THEY NOT?



Malleable and Wrought Pipe Hooks and Straps

Complete stock of every size and kind. Quality the best that can be made. B.B. Ornamental Pipe Straps, all even, clean cut, brightly tinned. Ask for catalogue and prices.

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Baldwin's

Last and best work on Hot Water Heating

Hot Water Heating and Fitting, or Warming Buildings by Hot Water. A description of Modern Hot Water Heating Apparatus; the Methods of their Construction and the Principles Involved. By Wm. J. Baldwin, A.M., M.E. 3d ed. Ill. 8vo, cl. New York, 1891. **$4.00.** Sent postpaid on receipt of price.

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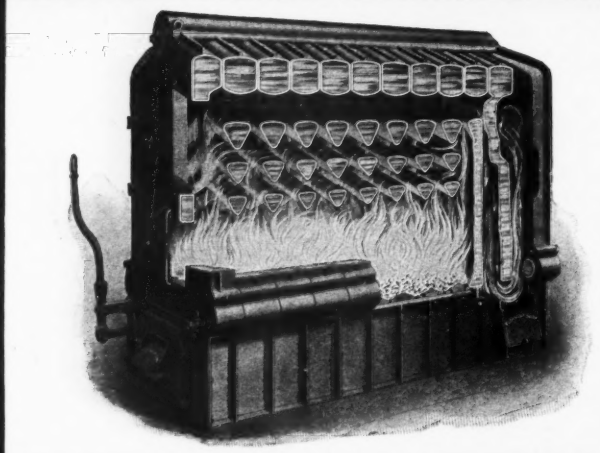
"BURNHAM" BOILERS

FOR STEAM AND WATER HEATING.



RELIABLE,
DURABLE,
ECONOMICAL,

QUICKLY SET,
TIGHT JOINTS,
EASILY MANAGED.

LORD & BURNHAM CO.,

GENERAL OFFICE AND WORKS,
IRVINGTON-ON-HUDSON, N. Y.

NEW YORK OFFICE,
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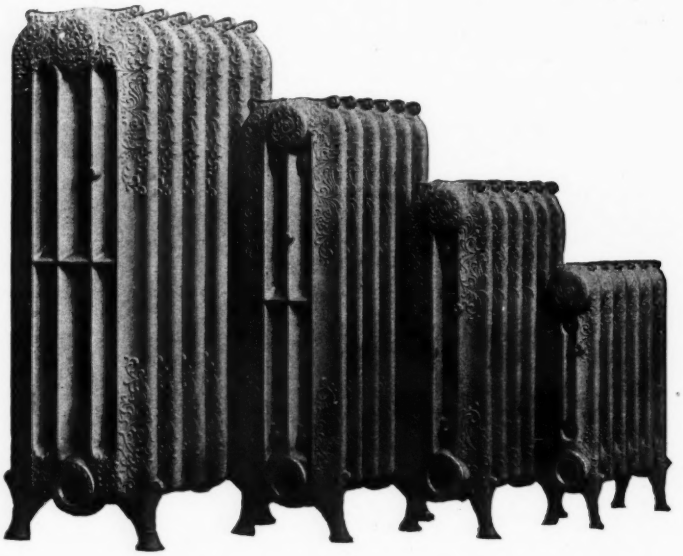
TRITON RADIATORS

We have told you a number of times about our 1, 2, 3 and 4 column

Triton Radiators

and this is the first view we have ever had of the different widths together. Our new catalogue just out tells all about all of our radiators. Ask for one.



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The Richmond Stove Co.
Norwich, Conn.

DOMESTIC ENGINEERING

Plumbing : Heating : Lighting :: Ventilating

Whole No. 146 DECEMBER FIFTEENTH, NINETEEN HUNDRED AND ONE Vol. 22, No. 3

New York Trade School.

Good Work being done at this Technical Training School.

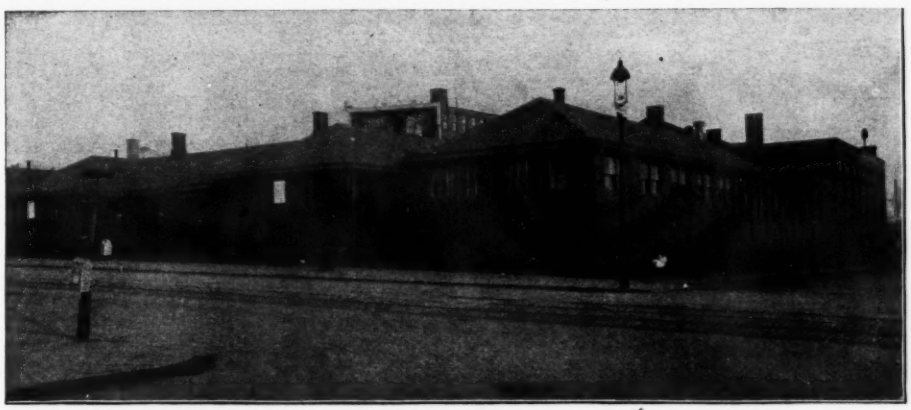
By E. L. McCulloch.

THE New York Trade School, 1st avenue and 67th street, began its work for the season of 1901-2 on Monday, December 9. On that date the day classes of the institution started their work for the twenty-first time. This date marks the twenty-first birthday of one of the most helpful institutions for young men in this greatest city of America.

The evening classes had already begun their work. They had their opening October 14. But the real work of the trade school did not begin until Monday, December 9, when members of the day classes met and started in on their work for the ensuing year.

Generally when a young man or boy apprentices himself to learn a trade he is employed simply to make himself useful about the shop, and no one takes time to give him the instruction he should receive. This neglect makes his progress slow. In a trade school every effort is made to advance the student. By reason of this care it is not long until he is able to use tools and is capable of doing work that makes him of real value.

Students entering the day classes come from almost every state east of the Mississippi and from many of the states in the middle and extreme west. There are even entries from Mexico, Canada, Cuba, and the Philippine Islands.



View of School Buildings from First Avenue and 67th Street, New York City.

Then the heavy machinery of this great institution was started, not to be stopped until April, 9, 1902.

This year there will be day and evening classes in plumbing, gas fitting, steam and hot water fitting, electrical work, cornice and sky-light work, blacksmith's work, drawing, bricklaying, plastering, pattern making, carpentry, sign painting, frescoe painting, house painting, and printing.

This school was founded in 1881 by the late Colonel Richard Tylden Auchmuty and H. V. Brill, superintendent of the institution, expects the school year of 1901-2 to be the most successful year in its history. And he has every reason for expecting so much. It is considered one of the best trade schools in the world. Mechanics of high skill and long experience act as instructors, and each student receives individual care and attention, careful explanation being made to each of every step in the various courses.

The plumbing department this year will be under the supervision of a trade school committee composed of Edward Murphy, George· D. Scott, Frank Reynolds, Thomas J. Tuomey, and James Muir, who are members of and were appointed by the Master Plumbers' Association of New York. John J. Delehanty, one of the best known plumbers in this city will personally direct the work of the department.

Plumbing was one of the first trades to be taught at the New York Trade School, and the classes, both evening and day, have always ben largely attended. The shop is 37x112, which allows not only ample accommodations for work benches, but permits the erection of basins, boilers, sinks, wash trays and other work on an extensive scale. Each student has his allotted place at a bench, and a compartment in a locker in which to keep his tools, work and overalls.

The work benches are equipped with furnaces and pots

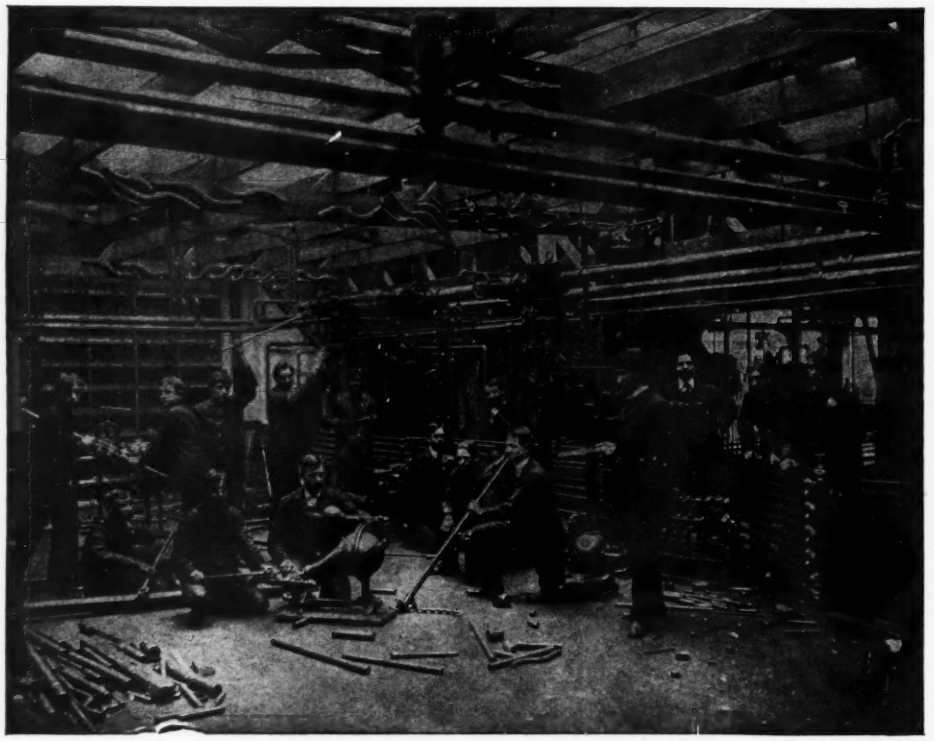
of a special make, which allows the solder to be heated by gas. There are ventilating fans to keep the air pure.

The practical work of the course includes running and calking soil pipe; seams; overcast joints; cup joints; wiping ⅝ inch horizontal round, horizontal branch and upright round joints; making quarter bend; wiping ⅝ inch upright branch; stop cock; floor flange; 2-inch ferrule; bath plug; vertical branch; wall flange; making half S and S traps; wiping large and small soldering nipples; 4-inch upright and horizontal ferrules; upright and horizontal tank seams; ½-inch horizontal round, horizontal branch; upright round and vertical branch joints; ⅝ inch oblique round and overhead round joints; plain bib vertical branch; 2-inch horizontal round; upright round; upright branch and vertical branch joints; 2-inch short bend with ferrule; 4-inch short bend with ferrule; setting up sinks, basins, boilers, wash trays; closets, bath tubs and miscellaneous work.

Scientific instruction will be given on drain, soil and waste pipes; trapping and ventilation of drain, soil and waste pipes; supply pipes; boilers, fixtures; trapping of fixtures; pumps; disposal of sewerage in country houses; water supply for country houses; miscellaneous; correcting diagrams of improper plumbing.

In the evening department the lectures are given during the students' first term, allowing two nights each week for practical work. Three evenings each week are devoted to practical work during the remaining terms. This arrangement allows a student in the evening plumbing classes to study drawing if he so desires. A course in drawing would assist him materially in obtaining a knowledge of building and plumbing plans and is taken advantage of by many of the students in these classes.

The series of lectures treating on science of the trade has been arranged with great detail and thoroughness. For each of the subjects printed forms are furnished, containing questions with blanks left for the answers. The lecturer reads the question and writes the answer to it on the blackboard. This answer is then copied into the blank spaces in the printed forms by the students.



STUDENTS AT WORK IN FITTING SHOP.

The lecturer then proceeds to explain what is meant, illustrating his meaning by diagrams and answering questions put to him by members of the class. The printed forms are kept by their owners for future reference.

Members of the class are given improperly arranged plumbing to correct. Many of these diagrams of improper plumbing are reproductions of actual work that has been put in by incompetent workmen.

A knowledge of plumbing is acquired by this course of manual and theoretical instruction which could not be obtained in any other way. A young man to succeed in the plumbing trade in this advanced age must know far more than was required of him years ago, when a mechanic with no special training could hang out his sign as a plumber.

The sessions of the day plumbing classes last from 8:30 A. M. to 4 P. M. every week day except Saturday, when the school closes at noon. These classes are reserved for young men between 17 and 22 years of age. An attendance of four consecutive months is necessary to qualify for certificate. The tuition fee is $40 for the course, payable when name is entered. An extra charge of $5 is added if instruction is wanted in lead burning.

The evening classes in plumbing meet on Monday, Wed-

nesday and Friday evenings, from 7 to 9:30 o'clock, and an attendance of three consecutive terms of six months each is necessary to qualify for a certificate. The tuition fee for the first term is $14. For the second and third terms it is $7.

Like for the course in plumbing the cost of the course in steam and hot water heating is $40, and an attendance of three consecutive months is necessary to qualify for a certificate. The class hours are the same. Both evening and Sunday classes are reserved for men between the ages of 17 and 25 years. The tuition for the evening classes are the same as for the evening classes in plumbing. An attendance of two consecutive terms of six months each is also necessary to obtain a certificate.

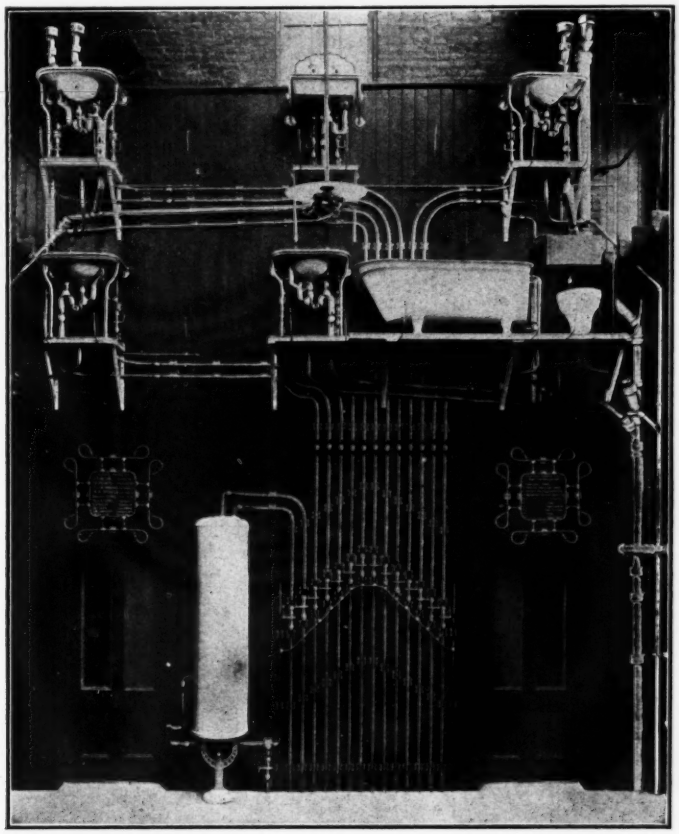
A committee composed of S. J. Geoghegan, George A. Suter, Q. N. Evans, James Curran and H. L. Hall, appointed by the Master Steam and Hot Water Fitters' Association of New York, has charge of this department.

Students in both evening and day classes are taught the practical work of setting and connecting different kinds of radiators, how to make the various kinds of coils in common use, such as return coils, miter coils, corner coils, etc.

Instruction is given in piping buildings and the various systems of heating, such as steam one pipe, steam two pipe, hot water, direct and indirect, high and low pressure. The students are given a set of plans and on these plans are drawn the actual heating plans that would be required for the kind of building represented.

The measurement of each pipe is taken from the plan, and the fittings, valves and other fixtures required to make a complete job are used in the construction of the work. There is an arrangement of girders in the work shop and beams to which the work is suspended, the pipes being run with proper pitch the same as would be demanded in actual practice. After each job is completed a connection is made with one of the steam lines of the school and the work tested.

The scientific instruction consists of lectures on the principles of steam and hot water heating and include the following subjects: tools, fittings and pipe; general heating; low pressure steam; indirect steam heating; single pipe low pressure steam; hot water heating; high pressure steam heating; steam power plant; exhaust steam heating; power fan or blower system of steam heating and ventilating.



STUDENTS' WORK, PLUMBING OF A THREE-STORY HOUSE.

The evening class in drawing, which meets every Tuesday and Thursday evening from 7 to 9:30 o'clock, is attended by a number of the plumbing and hot water and steam students. This course does not aim to make expert draughtsmen. The idea is to give the young men in the other classes who attend it instruction that will enable them to understand plans and drawings that may be met with in their daily work.

No certificate is awarded and no examination is held at the end of the year, as in the other departments. The class is reserved for men between 17 and 25 years old and the tuition is $6 per course.

The day class in carpentry, one of the oldest in the school, has a very practical course in carpentry, joinery and cottage building.

GOLD MEDAL PRESENTED YEARLY BY MASTER STEAM AND HOT WATER FITTER'S ASSOCIATION OF NEW YORK TO STUDENTS SHOWING GREATEST EFFICIENCY.

The evening class in pattern making is a new course, established for the first time this season, and will give a splendid opportunity to young men wishing a training in

WILLIAM H. KUHN, WINNER OF MEDAL, CLASS '98.

this very desirable trade. By reason of its increased demand and ever widening field it is one of the best trades for the skilled mechanic. The shop is equipped with the best made of modern benches, tools, lathes, band saws, etc. The course of instruction will be thorough and cover a wide range of work.

The day and evening classes in electrical work give a unique course of practical instruction in electrical work, from the simplest wiring to conduit construction and in the operation of electrical contrivances, from a simple bell

GEORGE A. SCHMIDT, NEW YORK, WINNER OF MEDAL, CLASS OF '99.

to a dynamo and motor. It has from its inception been popular and has a waiting list each year of young men anxious to enter.

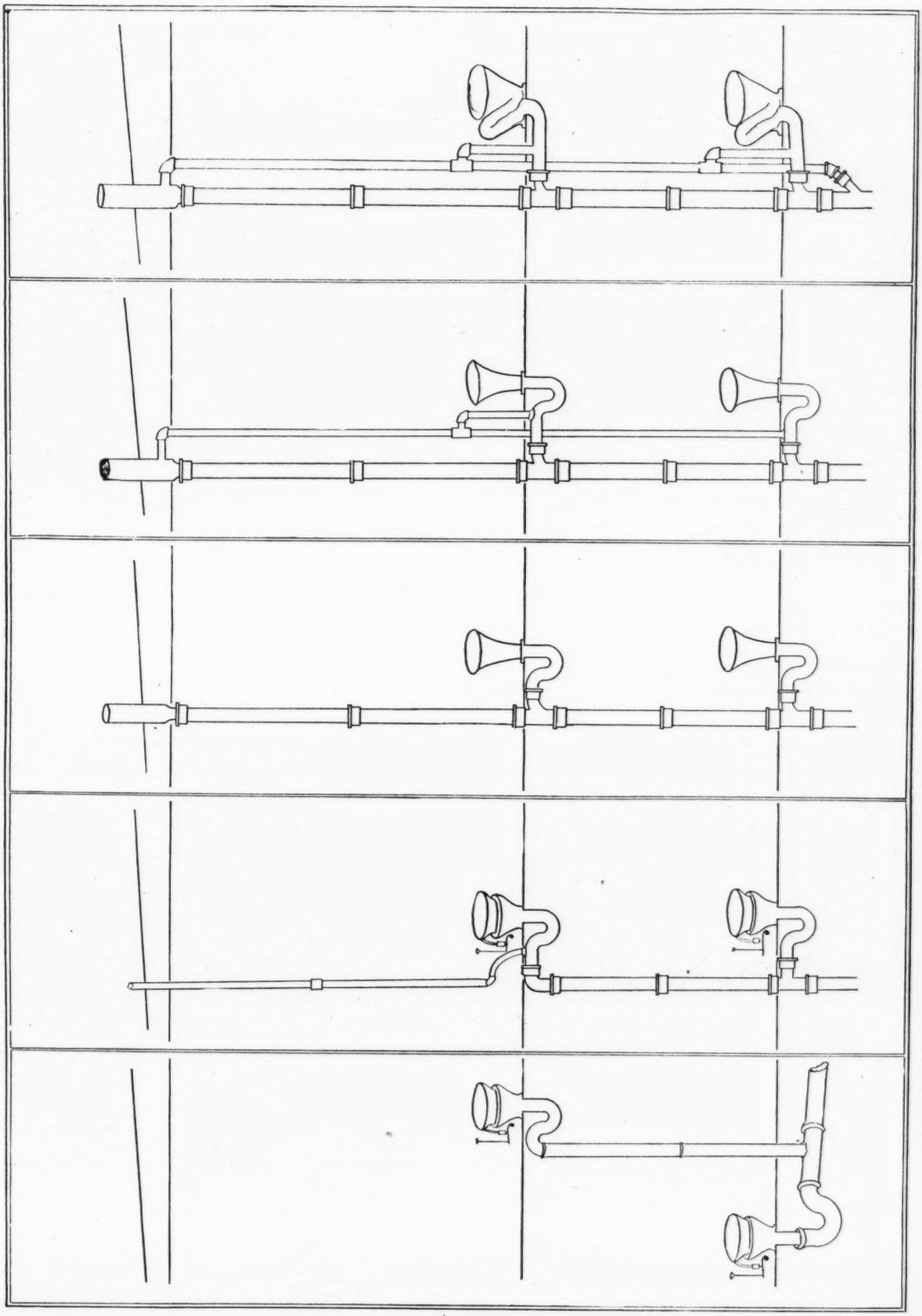
Students in the day and evening classes in cornice and skylight work are afforded an opportunity of acquiring not only practical skill, but also a knowledge of the development of patterns pertaining to this kind of work.

An evening class in blacksmiths' work embraces general blacksmithing, tool making, railing and ornamental

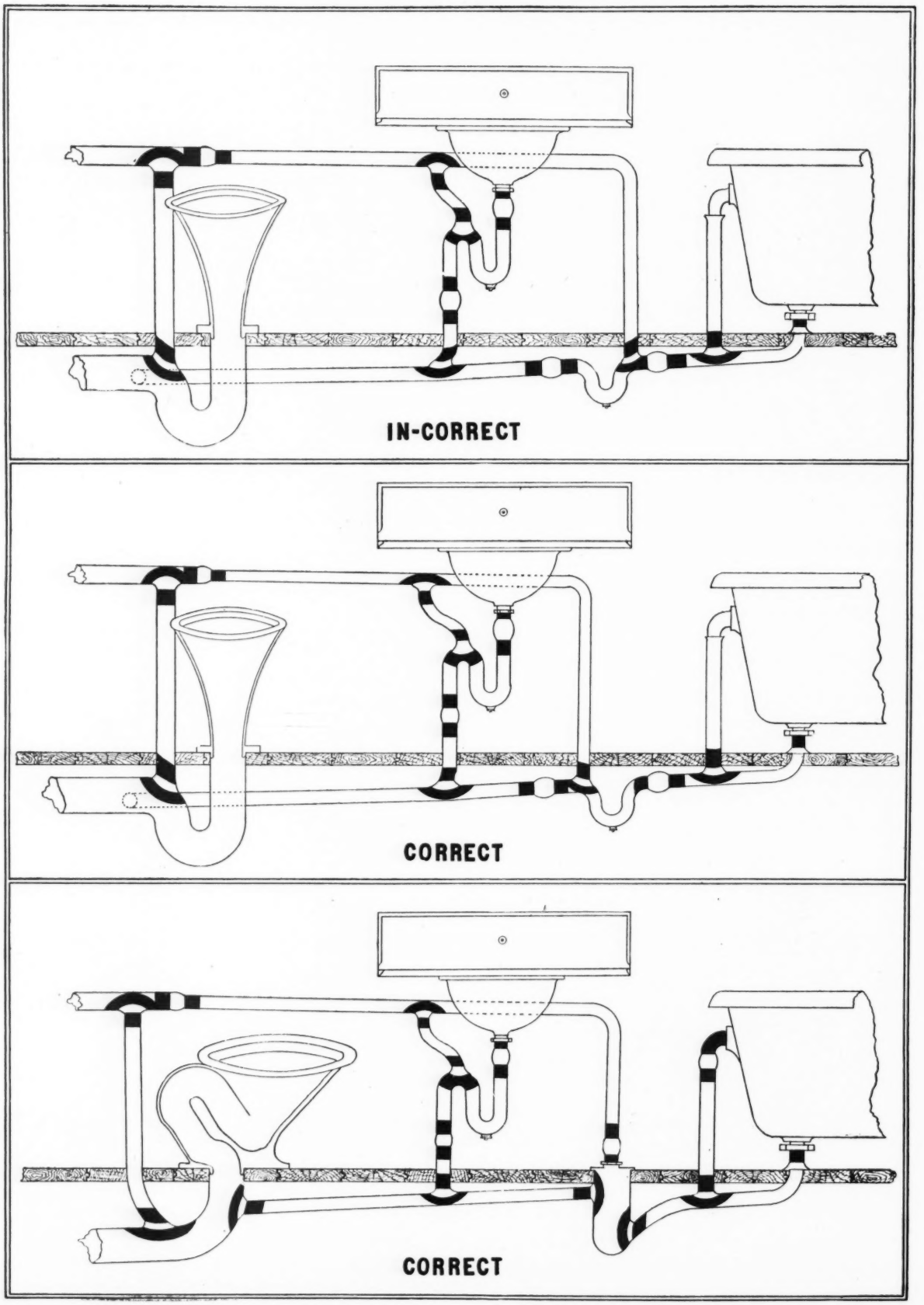
CALVIN P. BASCOM, ROCHESTER, WINNER OF MEDAL, CLASS OF 1900.

work. In tool making the instruction will include machine, lathe, millers', stone cutters,' carpenters', plumbers', pipe and steam fitters', tin and coppersmith tools, also the principles of tempering.

SANITARY PROGRESS.



Drawing kindly loaned by Andrew Young, Chief Sanitary Inspector of the Department of Health of the City of Chicago, illustrating the progress made in Sanitary Science, since 1889.



Incorrect and Correct Methods of Installing Bath Room Fixtures. Drawing kindly loaned by Andrew Young, Chief Sanitary Inspector of the Department of Health, of the City of Chicago.

Plumbing and Household Sanitation—XVI.

A Course of Lectures which, when completed, will cover the theory and practice of the art

By J. Pickering Putnam, of Boston, Mass.

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Copies of issues of Domestic Engineering containing the sixteen previous installments may be had at 20 cents each.

(c) *Valve Outlet Basin.*

Our next type of wash-basin corresponds in principle with the valve water closet. The outlet is closed by a valve working in a small chamber or receiver which, like the water closet receiver, is liable to become clogged with sediment. Moreover, the concealed machinery necessary to work the valve, complicates the apparatus, and like all

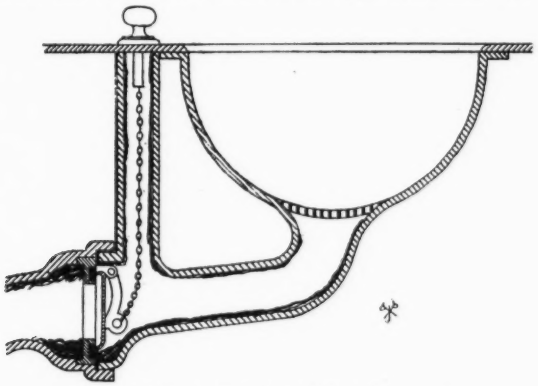


Fig. 190. Valve-Outlet Basin with Chain Movement.

machinery, especially that which works under dirty water, is liable to get out of order.

We have further subdivided this type into three kinds, i. e., those with (1) chain movement; (2) lever movement, and (3) gravity movement.

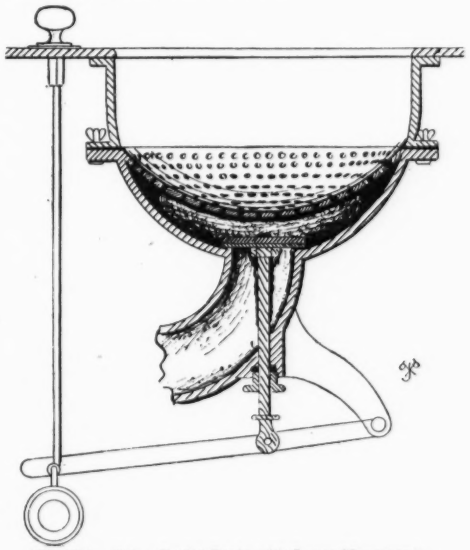


Fig. 191. Valve-Outlet Basin with Lever Movement.

Figure 190 illustrates the first kind. We have here two elongated cesspools and a receiver cesspool. No overflow passage is shown in this drawing, though provision for overflow is of course as necessary as in any of the preceding examples.

A valve arranged as shown here would never work satisfactorily. The slightest impurity adhering to it or its seat, would cause it to leak, and a little roughness or corrosion on the hinge might prevent its closing altogether.

Figure 191 represents a valve outlet basin operated by lever movement. The drawing shows a double bottom,

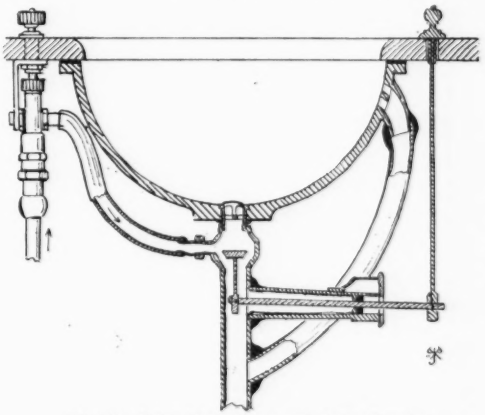


Fig. 192. Valve-Outlet Basin with Outlet Supply.

the upper one being perforated throughout its entire extent, and forming an enormous strainer. The valve receiver occupies the whole space between the two basins. The amount of inaccessible fouling space is here very large and of peculiarly objectionable form, the many perforations and corners being calculated to retain a great deal of filth. The waste water escaping through so many holes would pass without force or scouring effect and the cleansing of such a strainer would be practically an im-

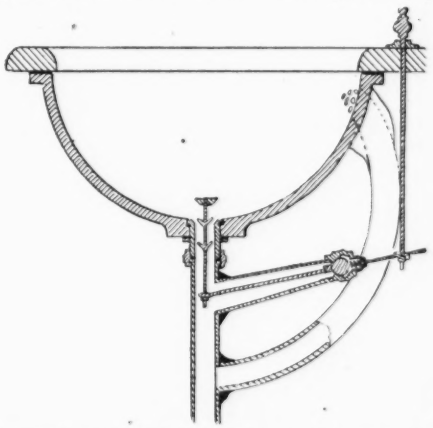


Fig. 193.—Valve-Outlet Basin with Improved Lever Movement.

possibility. Some overflow passage, not shown on the drawing would be required.

Figure 192 shows a basin of the same kind with a smaller receiver. The supply enters below the strainer which is evidently objectionable for several reasons. In case of

VALVE-OUTLET BASINS.

Fig. 201.

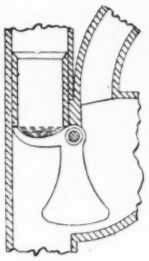


Fig. 195.

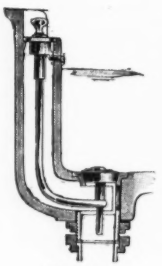


Fig. 198.

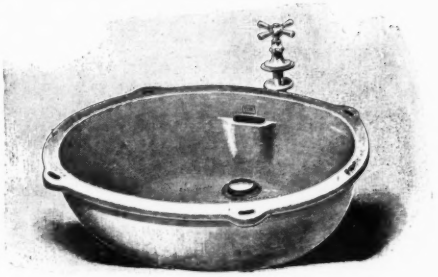


Fig. 200.

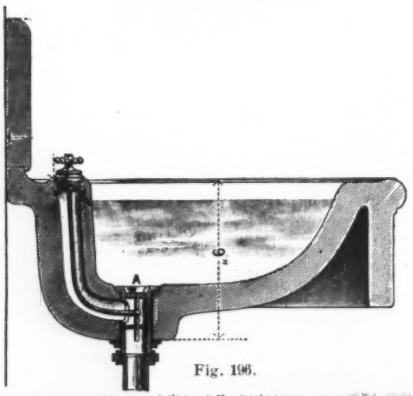


Fig. 196.

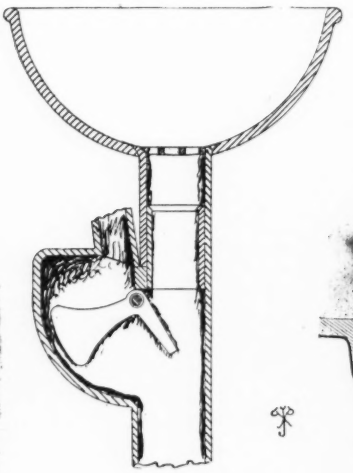


Fig. 194.

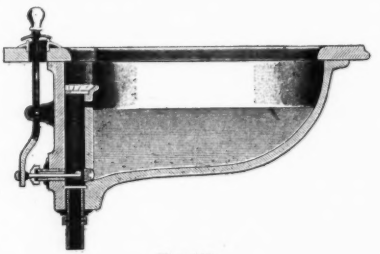


Fig. 197.

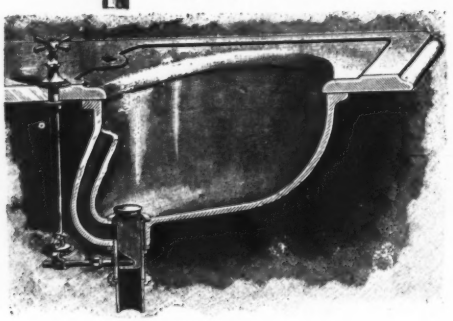


Fig. 202.

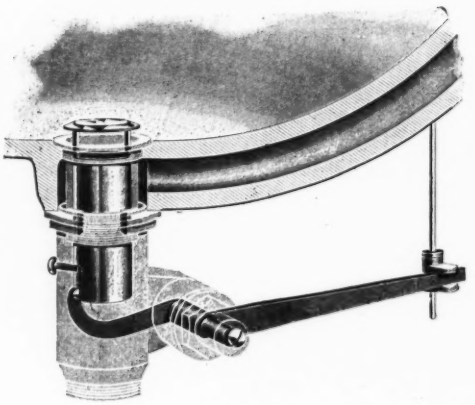


Fig 199.

PLUNGER OUTLET BASINS.

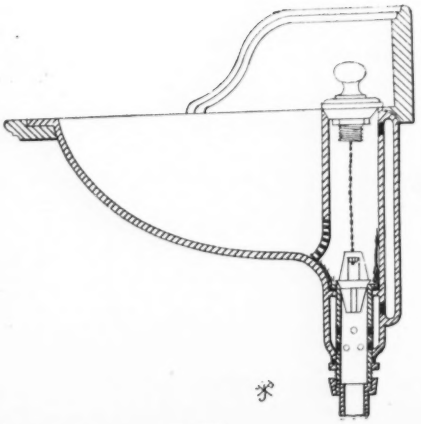


Fig. 205.

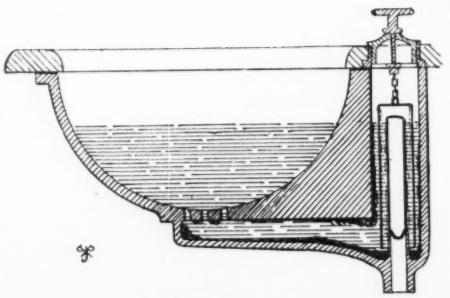


Fig. 204.

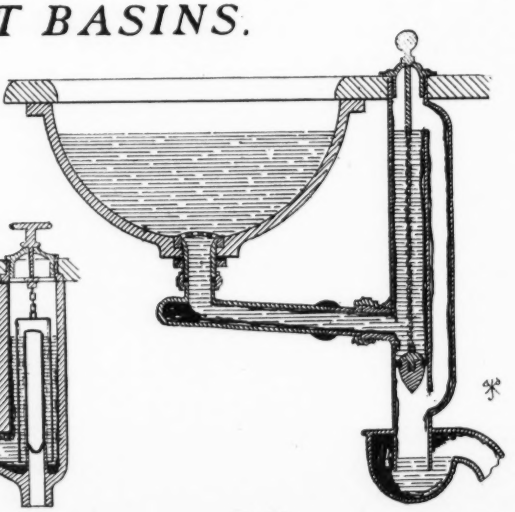


Fig. 203.

CONCEALED OUTLET BASINS.

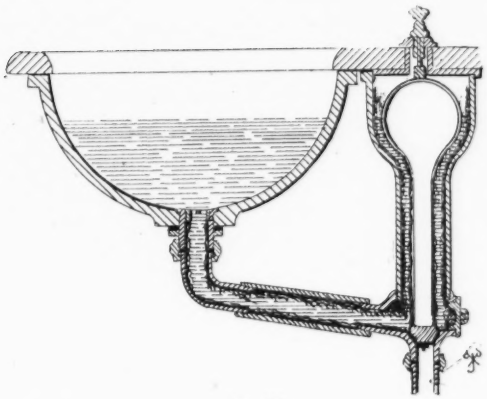


Fig. 206.

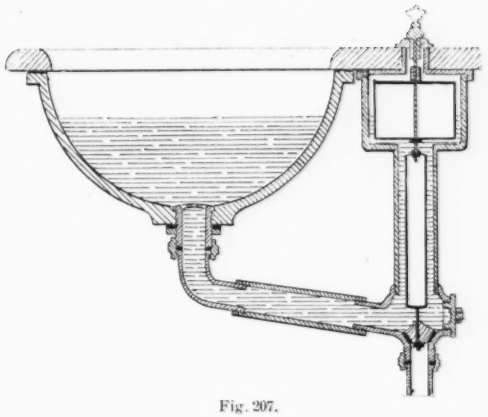


Fig. 207.

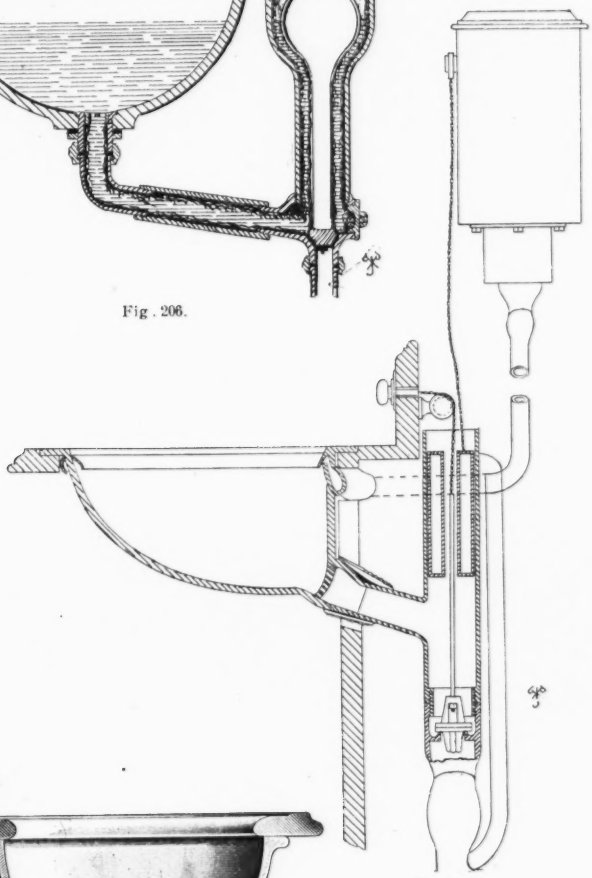


Fig. 208.

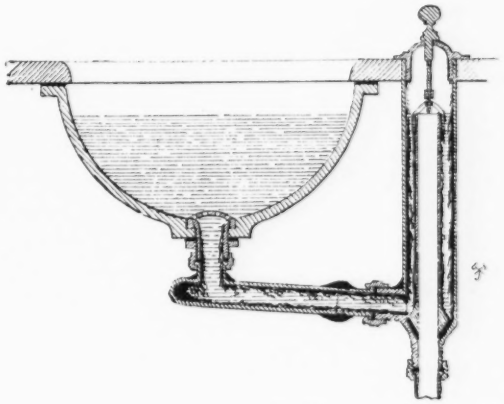


Fig. 209.

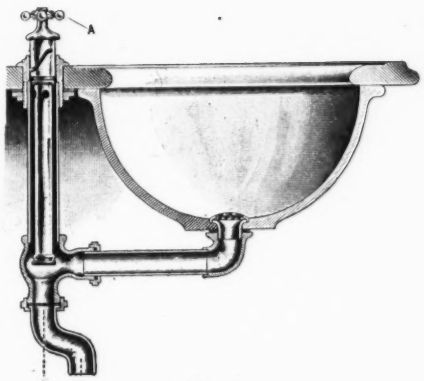


Fig. 210.

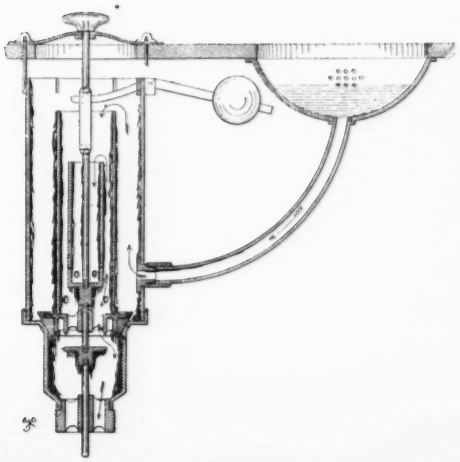


Fig. 212.

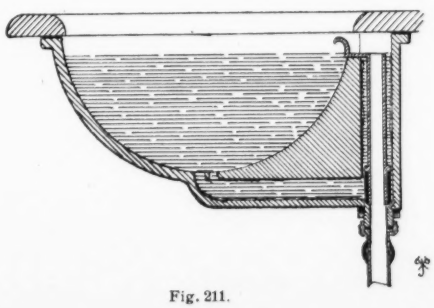


Fig. 211.

fluctuation in the water supply pressure, foul water might be drawn from the basin into the supply pipes. Moreover, the dirty deposits in the valve receiver would always be mixed with the first clean water entering the basin.

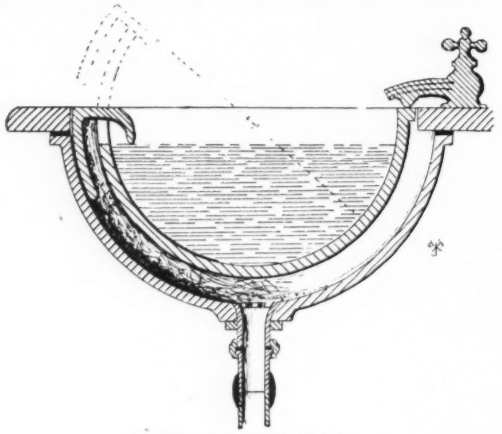


Fig. 213. Receiver Outlet Basin.

Figure 193 shows an improvement on the last device because the receiver above the valve is eliminated altogether.

Figures 194 and 195 give the third subdivision of our valve outlet basin, namely that in which the valve is operated by the weight of the water falling upon it. Comment on such a device is scarcely necessary, it being sufficiently evident that its action would be extremely unreliable and unsatisfactory. The valve is made flat or

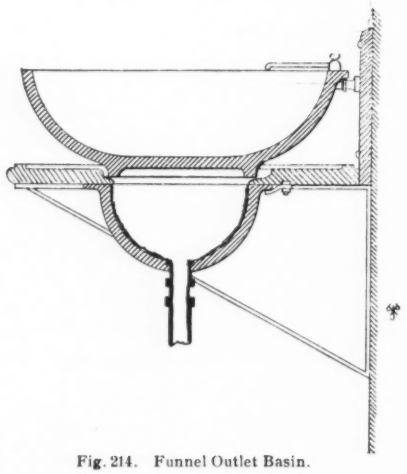


Fig. 214. Funnel Outlet Basin.

cupped on its upper surface. In the latter case water held in the cavity of the valve is supposed to assist in forming a seal.

Figs. 196 to 201 represent other forms of Valve Outlet Basin.

(*d*) *Plunger Outlet Basin.*

Our plunger outlet basin corresponds with the plunger outlet water closet and has its defects. Like the valve outlet basin it has several inaccessible fouling chambers. The type may be subdivided into two styles, namely: (1) That having a solid plunger, and (2) that having a hollow plunger.

In. Fig. 202 is shown a simple mechanism for basin discharge outlets in which an outlet valve is raised by a lever whose handle passes through the slab.

Fig. 203 represents t he first style. The plunger is supposed to retain the water in the basin by the friction of a packing ring of some elastic material against the inner walls of the plunger chamber. A D-trap appropriately

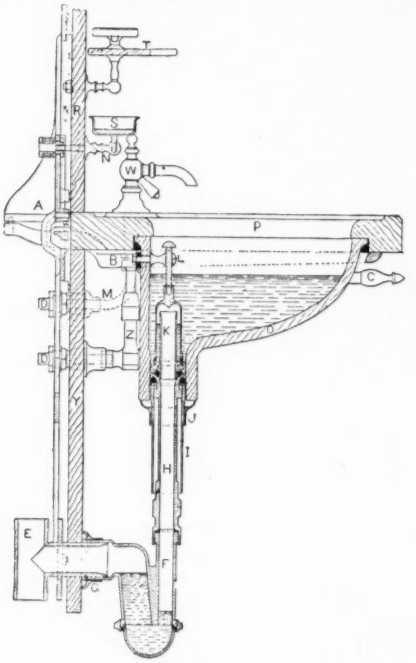


Fig. 215.

used under the plunger, completes a device which for extent of fouling surface, cannot easily be surpassed. Fig. 204 is an improvement on the last type. There are less fouling surfaces and the outlet passages are made of smooth earthenware. The plunger chamber is made accessible by unscrewing the plate at its top, and the horizontal channel below the strainer is the only part that cannot be reached.

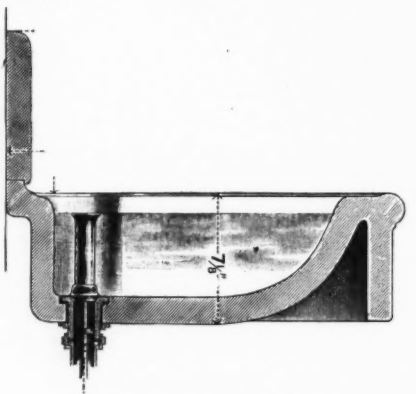


Fig. 216. Standpipe Outlet Basin.

Figure 205 is a still further improvement, inasmuch as the horizontal chamber is done away with by having a perpendicular back to the bowl. The overflow passage is faulty. It should have been constructed after the principle of the preceding fixture or better still in the form of a simple standpipe on the plunger.

Figure 206 represents the second style of plunger outlet basin in which the plunger is hollow. We have, however, here again the favorite cesspool triply emphasized.

(e) *Floating Plug Outlet Basin.*

The object of this device Fig 207 and 208 and 209 is to do away with the special overflow pipe. The plunger or plug has a hollow vessel at the upper end of its stem, and the receiver is enlarged at this point to give room for it. When the water in the basin approaches the point of overflowing, the plunger is buoyed up by the float (the water seeking its level in the plunger and float chamber), and the outlet is opened, letting the superfluous water in the basin escape.

(f) *Concealed Standpipe Outlet Basin.*

The object of this arrangement is the same as the floating plug in the preceding apparatus. It enables the special overflow pipe to be dispensed with, the hollow plunger rod serving instead. Fig. 210 shows the standpipe as constructed with a metallic chamber.

Figure 211 shows a concealed standpipe outlet basin made in all earthenware.

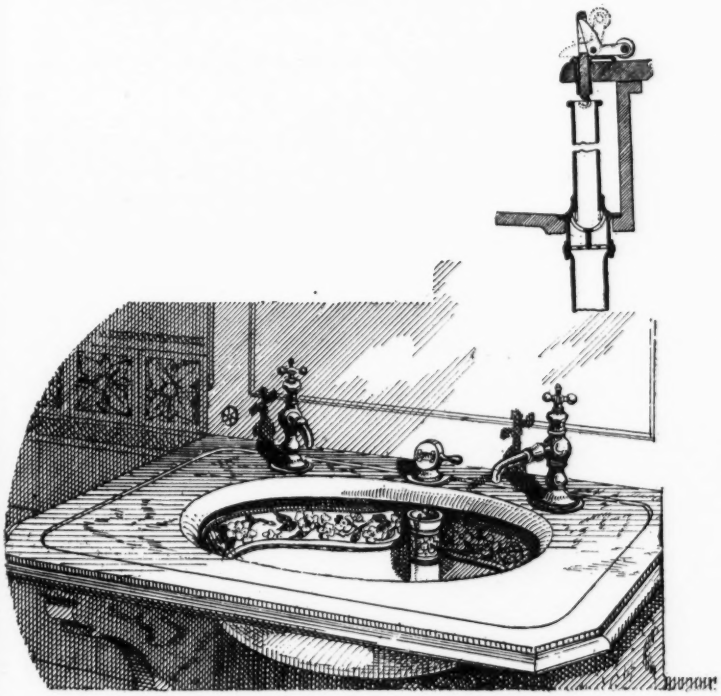


Fig. 217. Standpipe Overflow Basin.

Nearly all the heretofore mentioned types of basins have this very objectionable feature, that the mechanism controlling the outlet is arranged to work above and upon the slab covering the basin, and therefore involves the necessity of cutting the slab with great care and accuracy at this point. This requirement often involves considerable annoyance and always increases more or less the expense of setting.

Fig. 212 is a very complicated form of concealed standpipe Outlet Basin with an enormous amount of fouling surface.

(g) *Receiver Outlet Basin.*

The principal object of this device is to obtain a quick discharge. It consists of two basins, one within the other, the inner one pivoted, as shown in Fig. 213, in such a manner as to permit it to be revolved by means of a projection on the front edge, raising which empties the entire contents of the basin into a lower basin or receiver. Only half of the receiver is accessible, hence it inevitably becomes foul in use.

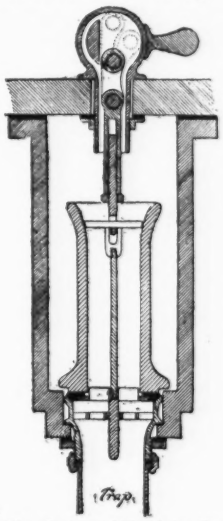


Fig. 218. Section of Standpipe Overflow.

II.—*Basins having Accessible Overflow Passages.*

In this class of fixture every part, both of the basin proper and of its fittings and passages, is visible and easily accessible, and kept clean from top to bottom without unscrewing or undoing any part. We find three subdivisions, (a) the funnel outlet basin; (b) the standpipe outlet basin, and (c) the rear outlet basin.

(a) *The Funnel Outlet Basin.*

Figure 214 illustrates our first subdivision. In general form it is similar to the one just described, but it has the advantage of enabling the entire surface of the lower basin to be reached for cleansing purposes. The interior of the outlet pipe may be inspected and, if desired, periodically cleansed throughout. It is intended that the upper basin should be lifted after use, and the waste water emptied into the lower basin or funnel. In case of overflow, the water runs over the edge of the upper basin and falls into the lower, whence it escapes into the waste pipe. It is evident that to avoid the trouble of lifting the basin it may be provided with lugs or pivots upon which it may be revolved as in the preceding example.

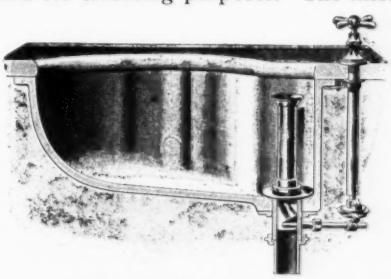


Fig. 220. Standpipe Overflow Basin.

Both of these types are altogether faulty in being based on the receiver principle, which also adds greatly to the cost and danger of breaking. The receiver is an entirely unnecessary complication and the basin has never been largely used in practice.

(b) *Standpipe Overflow Basin.*

Figure 215 gives an ingenious device in which a standpipe overflow is used. The standpipe is short, the water being retained in the basin by the pressure of the air between the top of the standpipe and the trap which has a deep seal for the purpose. A bell over the standpipe controls the discharge by forming a siphon, and in this way the overflow pipe is flushed every time the basin is discharged.

This fixture is fitted up conveniently with soap dish, towel racks and shelf and forms an exceedingly compact and attractive outfit.

Figure 216 shows an ordinary standpipe basin with the standpipe in a niche in the rear of the basin and operated by a simple mechanism on the stem in the outlet.

Three of the other drawings on this slide show other forms of standpipe and valve basins operated by simple mechanisms working through the slab, Fig. 217 being a perspective view of the device shown in section at Fig. 218 Figs. 219 and 220 show an other form of lifting mechanism for raising the standpipe.

Basins are sometimes provided with a flushing nozzle for connection with the water supply. The flushing device is added to ensure a perfectly clean overflow passage whenever the owner sees fit to operate it. A leakage of water-cock at this point would give rise to an unperceived waste of water, which in metred houses the owner might find objectionable. This fixture is constructed with a large outlet on the principle of the flush tank, and is in this respect highly to be commended.

(c) *The Rear Outlet Basin.*

The basin answering all the desiderata I have enumerated at the beginning of this lecture should have an outlet larger than its waste pipe and conveniently operated within the basin itself. It should be absolutely simple, having neither niche chain nor standpipe, and its overflow passage should be as clean and accessible as any other part of the fixture.

Drinking Water from Sewage.

How the Septic Tank Converts Household Waste into a Wholesome Water Supply.

IN Milton, Mass., near Boston, there is a plant for the disposal of sewage that is thought likely to revolutionize the sewer systems of America.

Sewage flowing from the house to which the plant is attached passes through a series of tanks, and is finally pumped out—clear, sparkling, odorless, tasteless drinking water.

Fifty feet from the cesspool, which is alive with bacteria and foul garbage, a person can stand on a raised platform and drink the refined water that filters from it.

The plant was put in by John N. McClintock, A. M. C. E., of 89 State street, Boston. Mr. McClintock was formerly a member of the United States coast survey, and has for many years made a study of sewage disposal.

Experts who have examined the plant at Milton seem to agree that the plan as demonstrated there settles the sewer question, that has vexed many city councils and countless boards of health.

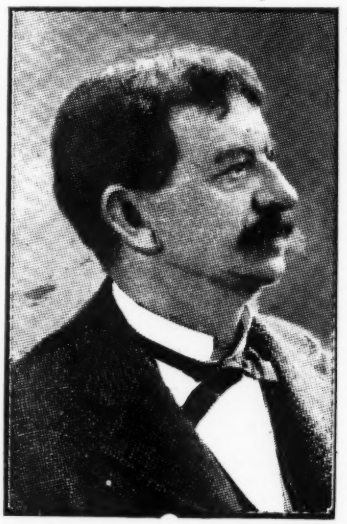
It seems incredible that water twice removed from a cesspool would be fit to drink, but by a system of filtration this remarkable feat is made possible.

Of course, as Mr. McClintock says, water from a cesspool is not for drinking purposes—there is a strong sentiment against the practice; but he points out that the main advantage lies in the fact that sewage can be converted into pure water, and therefore makes harmless any river or stream which is utilized to quench the thirst of a big city.

The place selected for the first demonstration of the system near Boston is that of Samuel Johnson on Randolph avenue, Milton.

Mr. Johnson, who has recently been remodelling an old house, was confronted with the problem of how to effectively dispose of the sewage from his residence without making its discharge offensive to himself and neighbors.

There has been in successful operation on his property for several weeks an invisible sewage disposal plant,



JOHN N. McCLINTOCK, A. M., C. E.

into one end of which the filthy output of the sewer pipe enters, which at the other end is pumped from a gravel lined well in the form of clear, sweet-smelling water.

This, while intended rather for irrigation and domestic uses, is fearlessly drunk by people about the premises and tastes like ordinary water.

Several of the workmen drank it in the presence of the writer yesterday, and Mr. McClintock did not hesitate to take a dose of his own medicine.

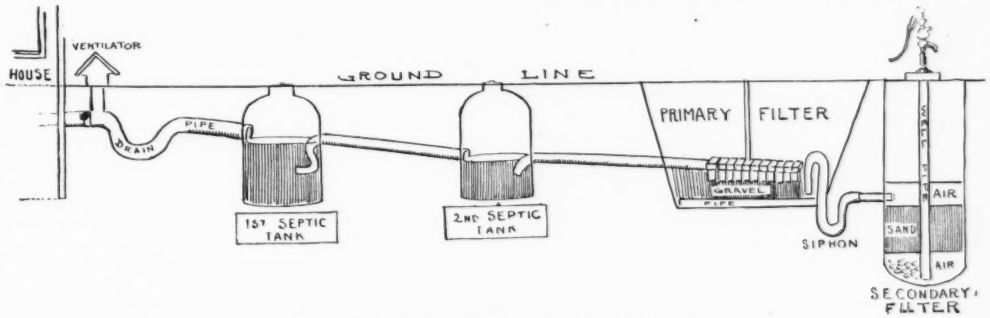
Divested of its scientific and technical detail, the disposal "plant" on the Johnson estate consists of a series of cisterns, or tanks, siphons and filtering beds, arranged so that the sewage will gently flow by gravity about 200 feet.

Practically everything connected with it is underground, so that its presence would scarcely be suspected, the only noticeable feature being an innocent-looking force pump at the end of the "system," and which, in lieu of a convenient brook into which to lead the effluent, is used to raise the latter to the surface.

The solid matter in the sewage, which is, of course, a small part of the whole, is seized upon by the omnivorous bacteria as soon as it has settled in the cistern, begins to undergo decay and finally becomes eliminated.

The first tank retains about 95 per cent of the solid matter and about 90 per cent of the dissolved impurities in addition, both of which come under the disintegrating influence of the bacteria.

Bacterial action continues after the effluent from the first tank begins to run through the pipe connecting with the second septic tank, and after it reaches the latter. It has been demonstrated that his particular form of bacteria will find lodgment upon rock, gravel, brick and almost any



GROUND PLAN OF THE NEW SEWER IN MILTON.

The distance from the corner of the house to the pump is about 50 feet. Nothing shows above the ground except the tank covers and the pump. Though the first septic tank is fermenting garbage night and day, no odor comes from it. Drainage from the house passes through the septic tanks, primary filter and secondary filter and becomes pure water.

After its emergence from the house the sewage is led through a ventilated trap into the first septic tank, 65 feet away. This tank, formerly an ordinary cistern, is about five feet deep and has a capacity of 500 gallons.

The lower part of the tank is faced with stones, and has long been impervious to leakage through the precipitation of sewage matter. In carrying out his ideas Mr. McClintock had the upper portion faced with brick and a heavy iron cover placed upon the manhole.

Two quarter-bends of pipe, connected in S or siphon form, lead from the upper part of the tank to the 100-foot line of Akron pipe that carries the sewage down to the second septic tank, but before these perform their functions the first tank has accomplished the most important part of the whole process.

In doing this it resolves itself into a sort of capacious "stomach" or digester, in which the organic matter in the sewage is attacked, after a certain lapse of time, by millions of amebic bacteria, or germs of disintegration and putrefaction, that shortly begin to grow and multiply in the tank.

The matter on which they live seems to give birth to this low form of vitality. It is a startling illustration of action and reaction.

The bacteria gather in the form of a thick scum; the number so contained in a square yard is incredibly large. At first they number about 1,000,000 to the cubic centimetre increasing in the course of 12 or 15 hours to 50,000,000.

They thrive without oxygen, the cistern being practically air-tight, preventing the formation of dangerous gas. Sewer gas will not generate unless a certain amount of air space is provided.

Both septic tanks are made water tight.

inorganic substance except glass, which, apparently, presents too smooth a surface.

With the effluent that issues from the first tank, however, bacteria only to the number of about 150,000 to the cubic centimetre escape, and are then known as faculative bacteria. They grow beautifully less as the journey of the effluent lengthens, because the food on which they thrive has been taken from them, so that when the partly purified sewage reaches the primary filter the quantity is reduced to about 10,000 to the cubic centimetre.

In this condition the sewage is in much the same condition of impurity as the water of the Merrimac River at the dam above Lawrence, just before it is sandfiltered for the use of the people of that city.

The second septic tank is of about the same capacity as the first. There the bacterial work is continued. A bottle of water was taken from the tank recently, and while it had a whitish, cloudy look, it was devoid of unpleasant odor.

The second tank is bricked, and, like the first one, has an iron cover. The liquid then runs into the filtering system, which is one of the most interesting features of the process.

This is divided into two parts, primary and secondary, and bacterial action on the effluent practically ceases with the secondary filter.

A trench 15 feet long and 3½ feet deep forms the basis. At its bottom is a layer of broken stone, surmounted by a layer of gravel, which is underdrained by an akron pipe leading the filtered water into a siphon set a foot below the bed and made of the same piping. This system is fed by a pipe which enters the second tank near the top.

The secondary filter, reached through the siphon, consists of an air chamber of cobblestones, above which rests

three feet of double screened gravel. An eight-inch akron pipe runs from the surface of the ground into this air chamber, and by means of a force pump the purified water is raised.

Mr. McClintock estimates that one cubic yard of filtering space is sufficient for a single person. This system will carry on its functions indefinitely, as the bacterial action taking place at the other end of the underground "plant" effectively takes out all the elements that serve to clog the ordinary sand filter so quickly, making frequent cleanings and renewals necessary.

MASTER HARRY TITUS,
One of the coming Plumbers of Uniontown, Pa.

Fifty feet of filter space have been provided, with 15 cubic yards of filtering material in this instance, because 15 is the average number of persons expected to occupy the house.

Roughly speaking, two-thirds of the space allotted to such a system of sewage disposal will be taken up by the filters and one-third by the septic tanks.

If such a plant were to be constructed for the use of the metropolitan district of Boston, therefore, it would require about 1,500,000 cubic yards of space for tank and filter system combined. This could easily be found. Mr. McClintock contends, in the vast acreage of marsh land around Boston now going to waste.

While the Milton demonstration is proving what can be done for the disposal of the sewage of private residences, summer hotels and camps, where the interests of a comparatively few people are involved, Mr. McClintock is enthusiastic over the possibilities of the system for towns and cities.

"To a city like Boston," said he, "it solves a problem that some day may be serious, the filling of the harbor by the continued deposit of sewage sludge.

"Before the construction of the present main drainage system Boston Harbor was being filled with sewage faster than docks and channels could be dredged. Even the present method of disposing of our sewage will in time result in filling up the harbor with a substance the most difficult of all to contend with."

It is said that the flow of sewage into Boston Harbor would fill the channel and make Boston an inland city in 1000 years and even less time than that with an increasing population.

The black mud on the channel bottom which has to be dredged out so often is the sewage which empties into the harbor from all sides. That its contaminating influence is felt even beyond the harbor limit is shown by the poisoning of sea moss as far away as Scituate.

And, by the way, the town of Scituate is considering the proposition of adopting a sewer system like the one at Milton, only on a larger scale. The town authorities have called upon Mr. McClintock to furnish the plans and estimates.

Oddly enough, the principle of the septic tank for sewage disposal was discovered accidentally by the late Amassa S. Glover of Brockton, in 1880. It was discovered by him while caring for the drainage of his own residence.

Being an observing and an intelligent man, he recognized its value, and applied for and obtained a patent in 1882, covering the principle. As the working out of the principle has progressed and put into actual operation as demonstrated at Milton, more patents have been obtained to cover added features.

Speaking about plant in a recent interview Mr. McClintock said:

The sewage deposal works in operation beneath the surface on Mr. Johnson's lawn illustrate a combination of natural laws which can be utilized for the advantage of the human race in a variety of ways.

The principle is adapted to the single homestead or the largest city.

It applies equally well to water purification and to garbage as well as sewage disposal.

It is no cause of offence on any ground or in any locality, therefore it can be used in public parks and pleasure resorts, on the sea beach or among the mountains.

It cares for the wastes of a community in a natural, reasonable and economical manner.

It absolutely separates harmless water from the contamination, and utilizes the contamination to cause the separation.

One cubic yard of sand and gravel can care for the wastes of one individual and destroy all germ life that is so dangerous to man.

One cubic yard of gravel can prevent a cubic yard of mud being deposited yearly in the harbor and will continue year after year for an age to protect the harbor or river from pollution.

Properly constructed plumbing will prevent any gases from escaping from the septic tank to the house, or, if the

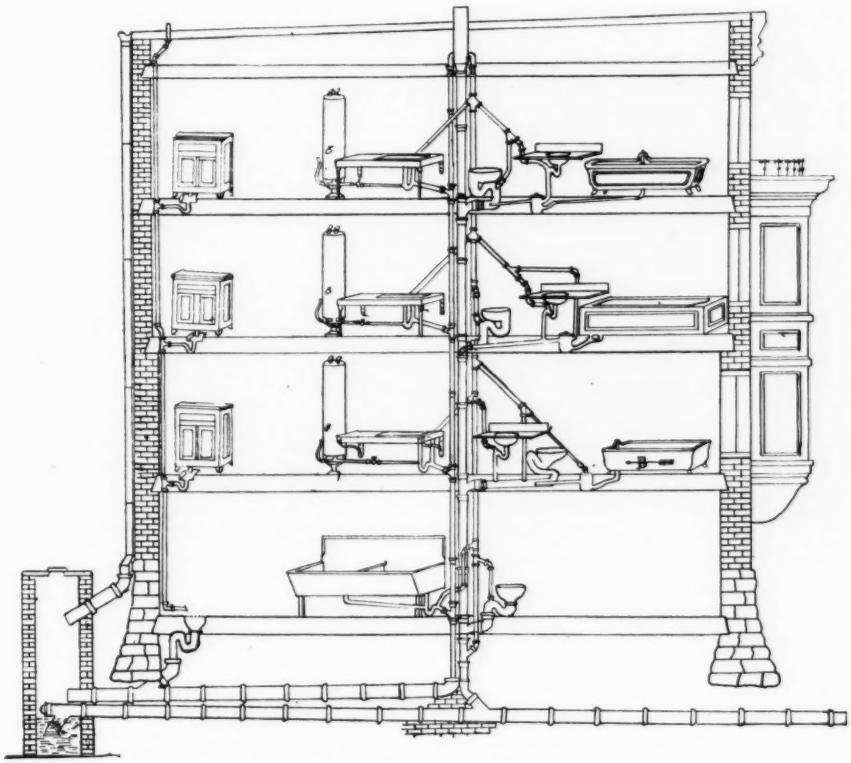
gas passes through the water tank, will carry it above the roof, to be dissipated in the upper air.

It is possible for the sewage of Chicago, for instance, to be so treated that it may run into the lake without danger to the city from using the water of the lake for domestic purposes. The water in the great drainage canal may be impounded, subjected to septic action, passed through a primary contact filter bed, and a secondary filter of fine sand, and be as pure before it is returned to the canal as the water served to the citizens of Lawrence. A very small per cent of the material excavation in building the canal would suffice for the purification of the water. A lock only would be necessary on one level.

Mr. Glover's discovery will lead to revolutionizing the world, because it makes it possible to gather any number of people in one city without fear of contagion, to restore the water of the harbor to its original purity, to prevent its contamination on a large scale, to render the shores delightful and attractive, to do with one ton of filtering material what required 40 tons by any other method.

It permits the rivers and lakes of the whole country to be purified and no longer offensive.

It will banish the plague, the cholera, typhoid, scarlet and yellow fever, and many other scourges known as water-borne diseases.



PLUMBING OF MODERN FLAT BUILDING.

The salt marsh in the neighborhood of the pumping station at Old Harbor Point could be used for disposal works, and the surface of some 50 acres required for the purpose could be made into a Marine Park of the most attractive character. The water from the system could be discharged directly into the harbor without causing offence.

The north metropolitan district could be treated in the same way on the marsh near Orient Heights.

Pure water, garbage disposal and sewage disposal are engineering problems of vital importance to every large community. Septic action in connection with filtration is the use of natural laws ordained by the Creator in the beginning for the benefit of man. As the world became more thickly settled, it became necessary to discover and utilize the combination; and I think the credit should be given for the discovery to the genius of the late Amasa S. Glover of Brockton. He should be classed with Columbus and other noted discoverers.

The cesspool can be converted into a septic tank at a very small expense. If the water is permitted to escape, the tank does its whole duty.

It has required much study to perfect this system, and it has met the most determined opposition, both in this country and Europe. It seemed too nonsensical to be even taken into serious consideration. It was too simple; it cost too little; it gives no offence to the eye, to the nose, or any other sense. It is the simple application of common sense.

Where there are sewers it may be adapted to their outlet. Where there are no sewers, it may be used for single houses or groups of houses.

If the system can purify water drawn directly through a cesspool, it can be made to furnish spring water of purest variety from any water supply. The raw material necessary for an artificial spring is about one-third of that necessary in disposal work, or one cubic yard for three individuals of a family.

Waste in Water Supply.

THE recent convention of the American Water Works Association in New York was the occasion for the presentation of several papers bearing upon the question of waste water supply in cities, the most important of these being contributed by Mr. Clemens Herschel, the well-known hydraulic engineer, others being by Mr. H. C. Hodgkins and S. J. Rosamond.

Mr. Herschel starts out to prove what at first appears to be an altogether self-evident proposition, that "thrift in the operation of water works is more economical than waste!" He takes this position because of the very general practice of proceeding on the contrary basis, and

Ed. C. Bates, Clarksville, Tenn., with his Plumbers and Helpers.

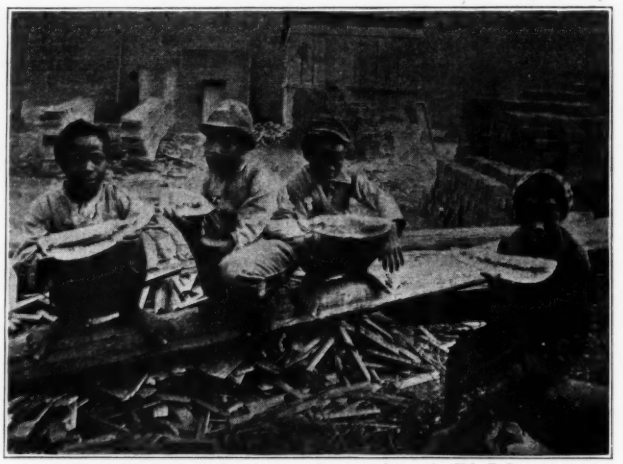
assuming that the proper thing in nearly all cities is to permit all the waste possible, and then extend the water works to supply the deficiencies caused by waste. This absurd position becomes more evident than ever when water purification schemes are considered and when millions are designated for the construction of water-purification plant when 75 per cent. of this expensive treated fluid is afterwards to be permitted to run away unused.

"It often becomes, and will continue to be desirable to purify water before it is delivered, but the enormous quantities wasted render such purification works very difficult to encompass. The cost becomes extremely burdensome when added to the already great cost of delivering these extravagant quantities of water under fire pressure, at the tap of the consumer. The large quantities drawn, mostly waste, cause the street mains and other conduits to become too small for the service demanded of them; this causes a lack of fire pressure, and great sums of money are constantly demanded for the purpose of furnishing larger mains and other conduits. The water originally delivered, now become sewage, is cast in huge volumes into the nearest water course—an entirely unlawful proceeding, be it noted, unless the receptacle be a tidal stream. It were well to purify this sewage, and communities can always be compelled by law to purify it, but its enormous volume, mostly waste, renders such purification nigh impracticable.

"So the sewage is allowed to pollute streams which should be the sources of city water supply, and thus natural bodies of water fit to be the sources of such water supply for the same, or for other cities, are made difficult to find, and these water-supply works are made many fold more expensive than need be—all this, it will be observed, to the end that needless waste may continue."

Mr. Herschel then proceeds to show how waste may be averted, or at least greatly diminished, by a judicious system of metering. Meters on the house service pipes should certainly be employed in all cases, and in the papers of both Mr. Rosamond and Mr. Hodgkins will be found interesting information as to the detection of local leaks by the use of meters. Householders should be taught to welcome meters as means of reducing their own payments for the wastefulness of others, as in nearly every instance the heavy wastes occur in manufacturing establishments, the cost being divided up among the community when meters are not used. District meters also render much service in detecting leaks in mains, since the readings during the night hours, when there are no demands upon the house services, will give clues as to wastes of this kind. The only reasonable way of diminishing waste is to apply the same common-sense method as is used in other kinds of work; to measure what goes in and what comes out, and charge people for what they receive, whether they use it or not. Such a rule, properly carried out, would soon cause waste water to disappear, and so far from injuring public health, since it would enable it to be greatly improved, it would permit the introduction of both water and sewage purification plants at reasonable cost, where now the expense is prohibitory.

There is, of course, one side of the case to which the work of the engineer does not apply, namely the fact that it is to the interest of those politicians who benefit by increased public expenditures, to permit those expendit-



Future Plumbers of Tennessee. Amateur Photo by Ed. C Bates.

ures to be as large as possible. Since water-works engineering is almost invariably mixed up with politics it is evident that waste will not be restricted unless the politicians' side of the question can be settled satisfactorily. Since political engineering is beyond the scope of this publication, this branch of the subject cannot be dealt with here, but its existence must be well known to all hydraulic engineers who have approached the water-waste problem.—Municipal Engineering.

Plumbing Knowledge for House Holders.

Some Pointers on Good Plumbing for those who Should Know.

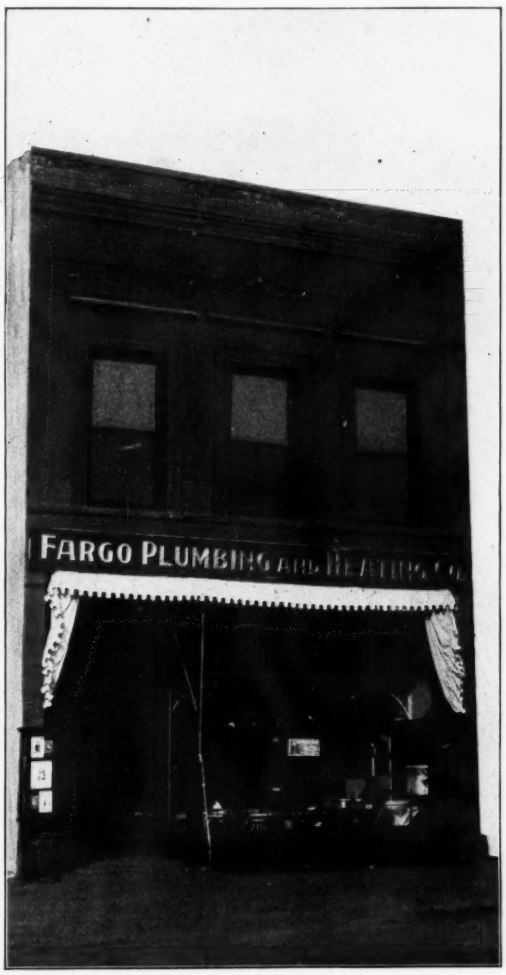
A LEADING contractor remarked recently that the walls of a house are its bones, the plumbing its veins and arteries. Hence, whetner buying, building or renting, it behooves every home maker to look well to the ways of it, and to know enough to make the looking effective.

In perfect plumbing three sorts of pipes run down to the main house pipe, which connects with the sewer; leaders for rain and snow water, waste pipes to drain baths and sinks, and soil pipes to receive the wash of closets. Waste pipes and soil pipes run up higher than the roof. Otherwise they would be a menace and fill the house with sewer gas. Attached to each of them there is a smaller pipe to secure what is called technically back ventilation. It goes out from the pipe below the lowest plumbing fixture and comes back into it above the highest. All along it receives smaller pipes from the crown of every trap. Thus, when a trap is flushed the air in the pipe beneath it does not struggle and gurgle through the water and finally pass into the room, but moves readily downward before the water, followed by clean air from the pipe in the crown.

To understand this fill a bottle with water, turn it upside down and watch the struggle of water and air as it empties. Refill it, and after inverting it break the bottle at the highest point. You will see the water drop out magically with no gurgles nor splashes.

A more important adjunct to the house pipe is the fresh air pipe. Most commonly it leaves the house pipe just inside the house trap, which is placed close to the cellar wall, and runs up and out to reach the air, ending, maybe, a foot above ground and sufficiently cowled. But in the best and newest plumbing systems the fresh air pipe runs to and through the roof going higher than the soil pipe. Thus the flow of air through the pipes is sensibly augmented with no danger whatever of fouling the upper windows.

Traps are the vital points of all sorts of plumbing. Some form of S trap is now all but universal. A trap so long



A Remarkably Fine Establishment for a City of 10,000 Inhabitants. This Company did over $70,000 Worth of Plumbing and Heating Work Last Year and will do even More this Season. Good for the Great Northwest!

as its water seal is unbroken, effectually bars the entrance of sewer gas, which is more properly sewer gas. There is a vague popular misconception on this point. Nearly everybody has come to believe in a specific toxic exhalation from sewerage but the last word of science is that sewer gas so called is only air mixed with sulphuretted and carburetted hydrogen, carbonic acid and the various products of decomposing human waste. Yet every inch of inside pipe surface shelters countless millions of bacteria harmless so long as the pipes are in use and therefore kept wet, but ready for mischief whenever the surface is allowed to dry.

The water seal is the water which after flushing remains in the lower bend of the S and standing well above the upper projection, permits nothing gaseous to pass. It may be broken in several ways. Evaporation is one of them. Where a trap stands in a warm place it should be flushed twice a day if not in use. Syphonage is another. Too great a head of flush water, especially if it carries considerable solid stuff, may set up suction to draw the water seal over the bend of the trap. Similarly, water poured in from a considerable height may have force enough in its flow to take the water seal away with it, since a liquid always seeks to reach the height from which it came.

Here is the way to tell if a trap holds its seal properly. Pour in a gallon of water very gently and after five minutes mark how high the water stands. Then flush the trap quickly and forcibly with the full head of the cistern. When the water is quiet again see if it reaches your mark. If it does, well and good—the trap is set and working right. If it is even a half inch lower there is danger ahead —you cannot too quickly call in a competent plumber. To test a trap for sewer air, light a long taper and hold it just above the water as you flush the trap. If the flame is drawn down your plumbing is properly ventilated; if it flutters upward sewer air is rising through the flush water. The flame will burn upward, of course—you must judge whether there is whirling and sputtering such as are caused by up currents of air. If you suspect a steady escape of sewer air put a bit of lighted candle in a tin candlestick in the closet above the trap. Leave it undisturbed for three hours and keep the bathroom closed. Sewer air is so full of carbonic acid that any considerable escape of it will in that time extinguish the flame.

Another test especially valuable for sink traps and screened traps generally, is that of a silver spoon. Rub the spoon as clean and bright as possible and either lay or hang it for twelve hours in the suspected spot. Even a trace of sewer gas will blur and begin to tarnish it. The flame test also applies to such traps, though less potently, as the grating in a measure breaks up the flow of gas.

Open plumbing is a boon little short of light and air. It enables you not merely to see the sort of trap and its location, but also to make sure that proportion is properly observed. Proportion is all important for many reasons. The chiefest of them is that where a pipe is too big for the water flow it is never properly scoured. Right here it may be well to say that a four inch pipe will take four times as much water as a two inch pipe; also that friction. which is the retarding influence in the scouring exists in the same ratio. Too big a trap is particularly dangerous. Unless every particle of dirty water is forced out beyond the water seal the trap becomes a miniature cesspool in which waste matter continually decays and poisons the atmosphere. No competent nor conscientious plumber thinks of using a trap bigger than the pipe that drains it. But there are artisans not overburdened with either knowledge or conscience. Hence it is well to know the right thing and insist upon having it.

These are the pipe materials in their order of desirability: Lead, brass, wrought iron, galvanized iron. In all cities of the first class the use of earthen pipe in buildings is strictly forbiddden. Earthen pipe in New York may not come nearer than ten feet of the outer walls. Whatever the material pipes should be so placed as to run as direct as possible, and so suppported where they run horizontally as to make sagging out of the question. Even a little sag means a potential leak and plague spot. Horizontal pipes should fall a quarter of an inch to the foot. Sinks also should be slightly lower than the surface they must drain. Bath tubs should not drain into soil pipes unless with double traps. If storm water is led into the main house pipe the area drains should be as carefully trapped as any other.

The Plumbers Registration Movement in England.

WHENEVER an attempt is made, no matter in what department of life, to do good or to abolish some crying evil, the vast majority of mankind seem to get together and exert their utmost powers to prevent its success. Human nature, Lord Beaconsfield very astutely discovered years ago, is at the bottom intensely conservative, and views with the greatest dislike and animosity anything calculated to lift it out of its old ruts. Inanimate matter possesses the same characteristic; there is even a scientific name for it—it is called vis inertia.

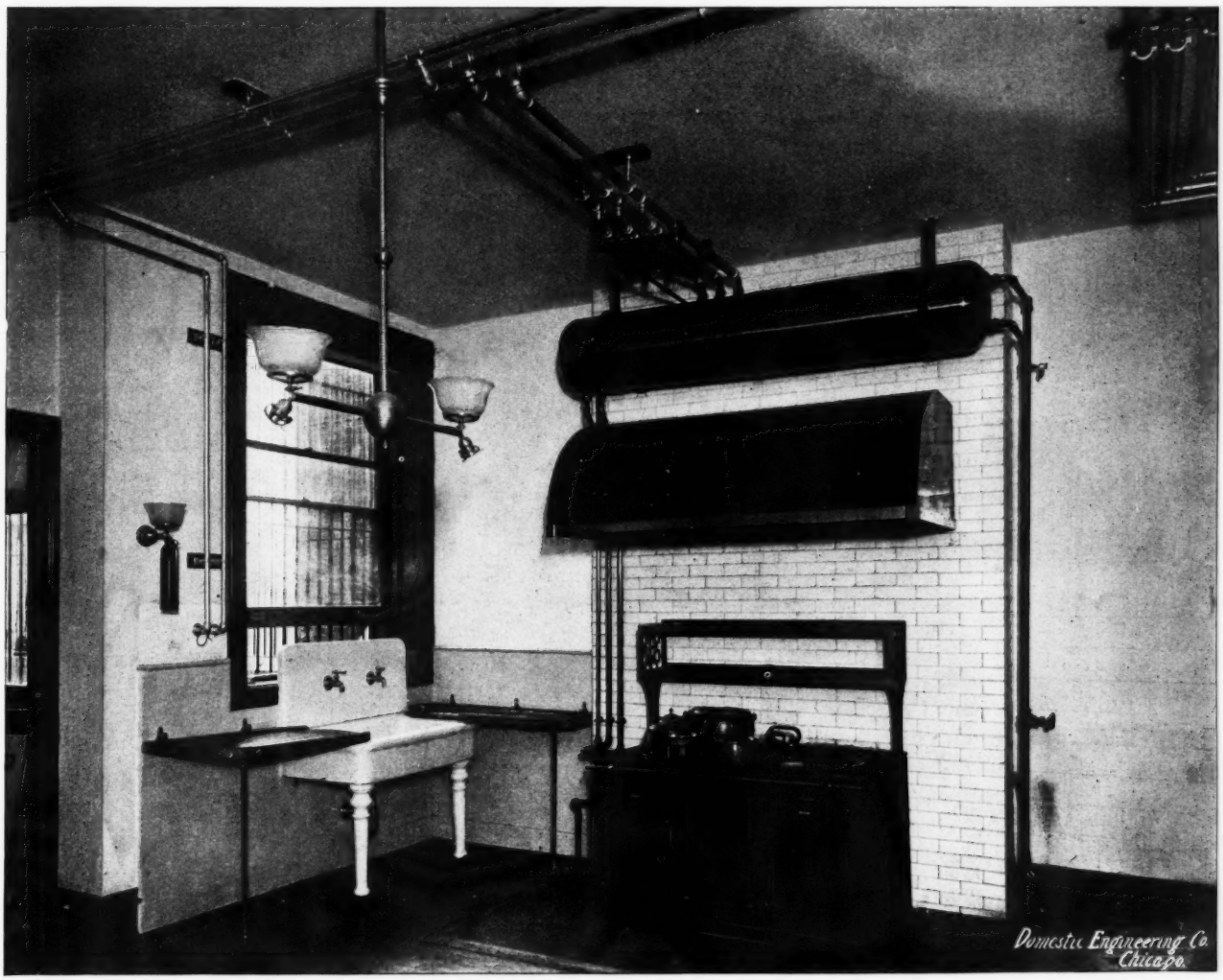
The Plumbers' Company, in their laudable endeavour to place the craft of plumbing upon a sound and satisfactory basis, have met with the experience of all reformers. They have been accused of selfish motives, and their efforts have encountered opposition from all manner of unexpected quarters. Educationalists have opposed them from motives of jealousy: they felt that the education of the plumber should be entrusted to them, who professedly knew nothing about plumbing. At one time the plumbers themselves opposed it—they did not want to be improved. But time and reflection worked wonders, and to-day it is no exaggeration to say that the entire plumbing trade is most anxious to be registered and protected.

They have discovered that registration is a most necessary protective measure, and that without it the very existence of their trade may be threatened. In these days of large business, when one firm will undertake to do everything, from selling a yard of ribbon to building a house, it is very important that the plumber should have a recognized and legal status, otherwise he may be crowded out, and the work that ought to have been entrusted to him may be given to any unskilled labourer to do. As we shall see, that is a very real danger, and it is therefore

not at all improbable that the great, sleepy, lazy general public will awake to a true sense of the danger they are exposed to by allowing their houses to be fitted by untrained men, and will demand that plumbers should be registered in the interests and for the safety of the community.

Meanwhile the ironmongers are uniting to make a stand against the movement. The ironmongers are afraid of registration; why it is difficult to understand, for the registration of plumbers could surely do no harm to honest ironmongers, who, as merchants, often employ plumbers, mis-statements that the solicitors to the promoters of the Registration Bill in Parliament wrote to the City Press, in which the paper was reported, to expose them. Mr. Jno. Beal, the honorable secretary of the National Association of Master Plumbers, has also written to Domestic Engineering ridiculing Mr. Greenall's paper.

Nevertheless, we read in the Ironmonger that at a meeting of London ironmongers, called for the purpose of forming an Ironmongers' Federated Association for London, it was stated that one of the objects of the association would be to oppose the passage of the Plumbers'



HANDSOME KITCHEN INSTALLED BY I. J. BARTH, 110 UNIVERSITY PLACE, NEW YORK CITY.

and should, we had imagined, be only too glad to welcome a measure by the aid of which they would be certain of securing the services of efficient tradesmen, and could distinguish between real plumbers and people who called themselves plumbers. But the inherent stupidity—the vis inertia—of human nature has blinded their eyes to the advantage of registration; their cupidity leads them to fear that this proposed measure is part of a plot against them. A Mr. Greenall has been reading a paper at the Institute of Heating Engineers, in which he denounced the entire movement. His paper contained such gross

Registration Bill, and that Mr. Greenall had "done more than any other man to expose the injustice that would have been inflicted on ironmongers had the Plumbers' Registration Bill passed."

By "injustice" we suppose is meant that ironmongers, if the Bill were passed, would no longer have an excuse to employ unqualified men on plumbing work. What other "injustice" the Bill could inflict we fail to see.

Now, what are the objects of the Plumbers' Registration Movement? They were defined as follows at a recent meeting of Master and Operative Plumbers at Hereford:

"To elevate by training in workmanship, technical instruction and registration the status of the plumbers' craft; to provide thorough technical and practical training in every branch of the trade for the plumber who is a candidate for registration, and to give every competent plumber a certificate which would be recognized throughout the Empire?"

By legal registration it will be possible to disqualify and strike off the register any registered plumber convicted of having scamped his work, and this would, of course, be a great safeguard to the Public Health.

The passage of the Registration Bill for Plumbers would be a distinct protection to the public, for it would enable them to distinguish between real and bogus plumbers.

In how far the ironmongers would suffer it is indeed difficult to see. We should have thought that all honest and right-minded ironmongers would have welcomed the Bill with acclamation and done all in their power to assist its passage through Parliament. But human nature is so densely stupid that it cannot be made to see its own advantages, and in every innovation proposed for its benefit and welfare it seems to sniff a lurking danger.

One day everybody will wake up to the advantages of registration, people will even wonder how it was possible to do without it. *Public Health Magazine, London.*

Influence of Technical Education.

MUCH has been said of late about the influence of technical and scientific education upon the commercial and industrial development of a nation. Doubtless there has been some exaggerated talk, and also some unwarranted assertions, but anyone who will take the trouble to compare the methods in vogue in that applied science which constitutes engineering at the present day with those followed say, twenty-five years ago, cannot help observing the changes which have been wrought by the entrance of the technically educated engineer into many important fields of work.

Apart from the direct utilitarian value of an engineering education, there is to be considered the so-called "cultural" value, and it is this phase of the question which was discussed in the recent presidential address of Professor E. O. Marvin before the Society for the Promotion of Engineering Education.

Formerly it was supposed that a broad culture could be obtained only by the acquirement of a so-called liberal education; an education which was really far from being really liberal or broad, and was rather confined within decidedly narrow limits of thought and action. Culture is not a thing to be easily defined even where it can be readily identified. To a great extent it is an individual quality, but it is also a quality to be developed by education.

The man of culture must be a thinking and reflecting being, and in engineering training this important faculty can best be obtained by avoiding rush and hurry in the preliminary work. Overcrowding, together with instruction in empirical methods, and short cuts may give a certain degree of facility which is fatal to correct and mature habits of thought.

Very important, too, is the cultivation of the judicial faculty. Honesty of thought is really nowhere so important as in engineering work, and in no branch of work is sham so difficult to conceal. Shiftlessness of thought and action may frequently be glossed over, or covered up in other lines of life, but metal and stone are difficult things to deceive, and the laws of Nature will not be broken; on the contrary, he who tries to break them will in the end find that they will break him. This, then should be the aim of every teacher; to see to it that all standards are based on sound principles of right and wrong, of truth and falsity.

There can be no true culture for a man who does not work.

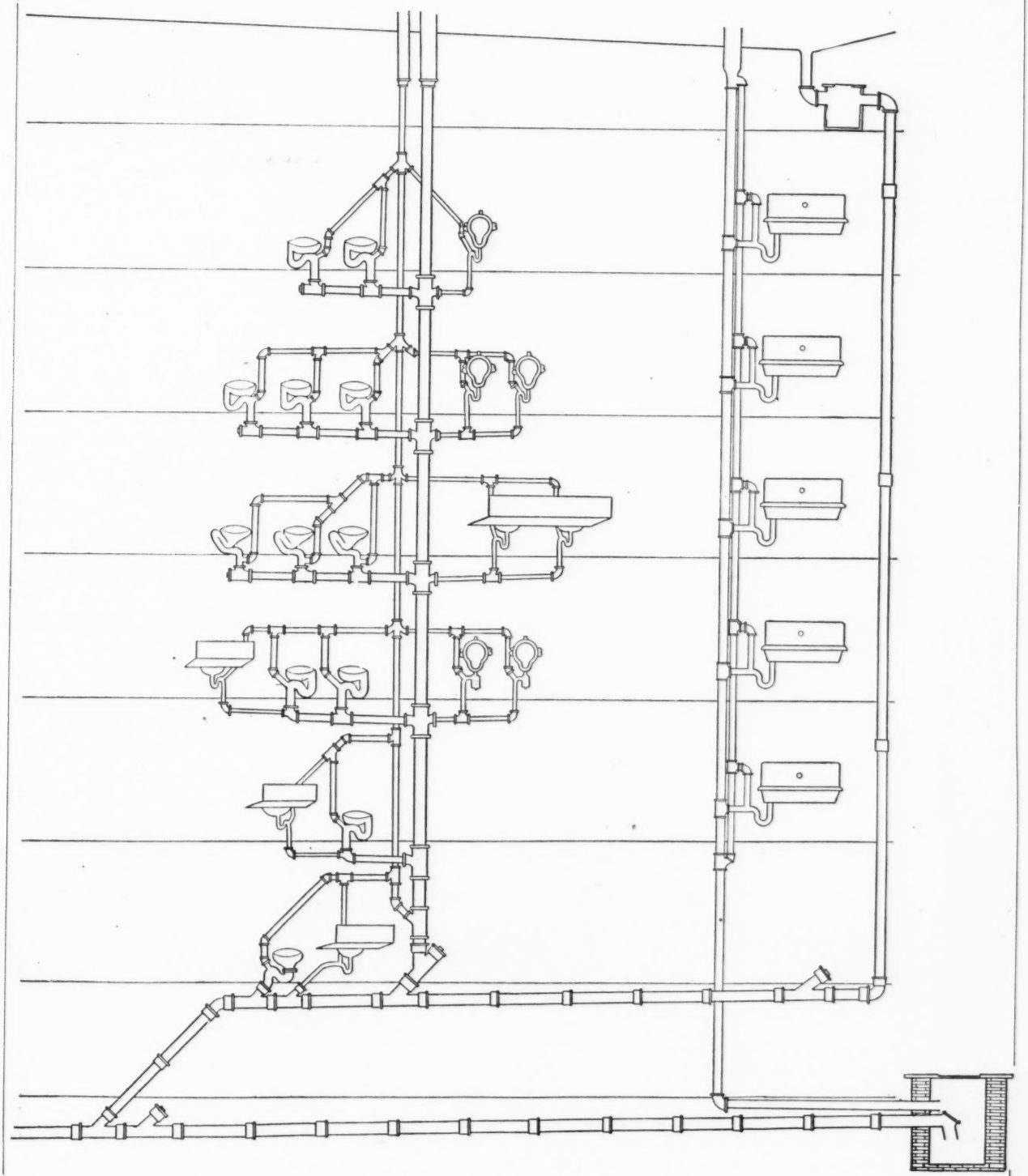
"A man expresses himself through his work, and whether he will or no he thus discloses to all who know him his own peculiar qualities. It is this intensity of application, this concentration of purpose and directness of aim that gets the world's work done. Here in early years the engineering student has the advantage of the student in arts. Study for knowledge's sake may be stimulating to the few, but for the many there is needed the goal of a special calling to secure the close application that results in ability to concentrate one's energy to the attainment of a certain end." As has been well said already upon the same subject: "It is better to know what to do and how to do it, than merely to know what has been done and who did it."

The importance to the engineer of mathematics and physical science is well understood, but these must not stand in the way of a broad general training. There are other things to be dealt with besides materials and physical laws, and engineers have also to manage men and matters of finance. "If they are rightly to influence those whose capital they are to expend they must be able to meet them socially and intellectually, to discuss intelligently matters outside of the pale of strictly professional life. Evidence of professional ability and skill is of course first demanded, but breadth of culture creates an added confidence in the wisdom of the conclusions reached and the advice given.

In addition to the ability to form correct judgments must be added the capacity to make a skilful and correct presentation of them in well-chosen and fitting English. This ability cannot be taught by training in the writing of compositions, themes, reports, etc., alone; it must in great part be absorbed by an early and habitual reading of the best that has been written in all lines of thought.

"As one looks forward ten or twenty years and attempts from present tendencies to forecast the work and social standing of engineers, he must see that the profession will be doing a larger work and exerting a greater influence. Further, that an engineering training will be more and more recognized as the one best fitted to lead to positions of an executive nature in connection with industrial enterprises and in the administration of public works. Everywhere will be demanded expert skill, sound judgment and broad views, primarily because these will be found economical."—Engineering Magazine.

PLUMBING PLAN FOR PUBLIC BUILDING.

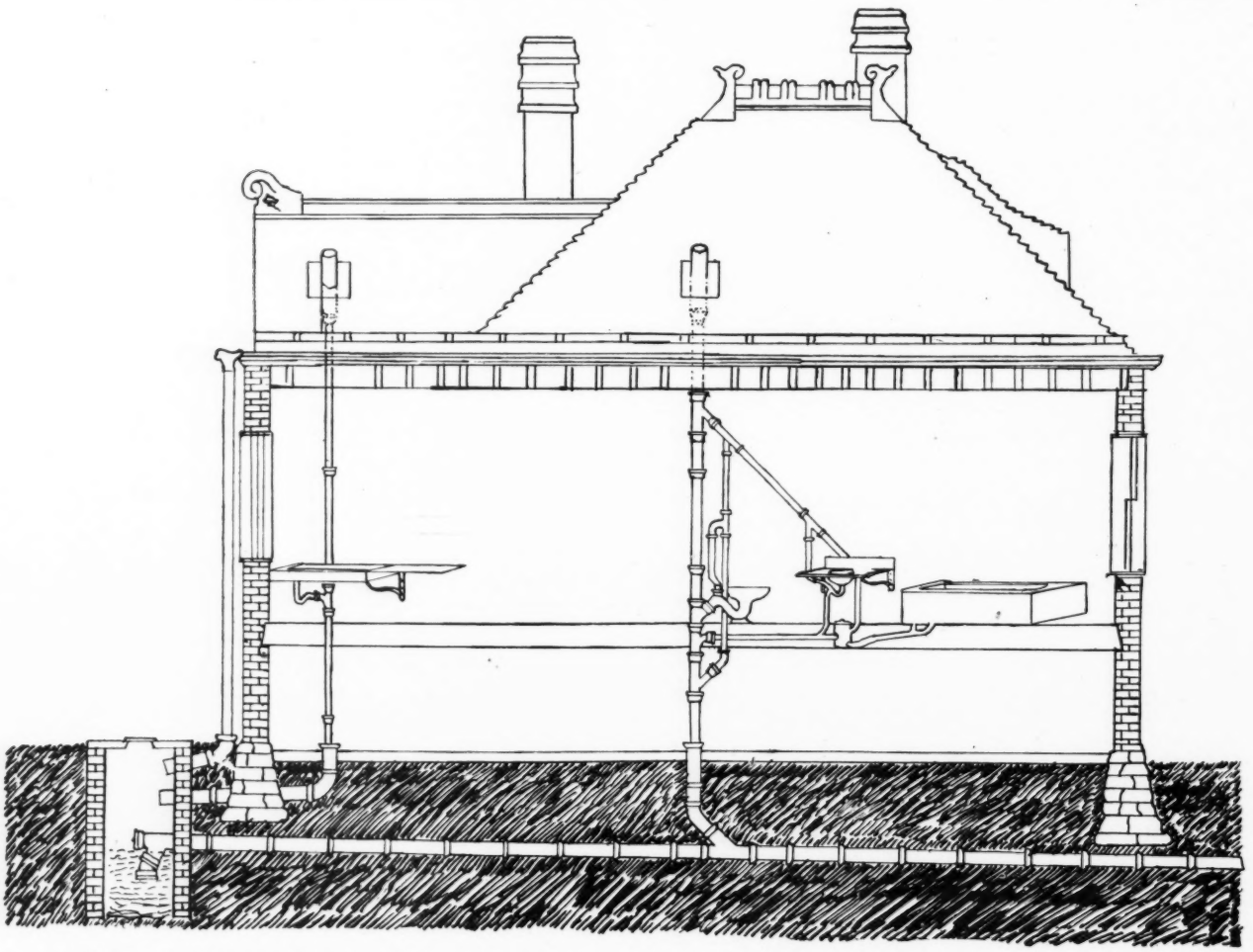


Laid out in Conformance with the Plumbing Ordinance of the City of Chicago.

A Woman's Advice to Women in the Care of Plumbing Fixtures.

By Emily Holt.

NOWADAYS the plumber and his bill are our true household specter. Like other specters, careful common sense will put them to rout and confusion nine times in ten. Wise men have been studying this subject ever so long to devise plumbing that would take care of itself, but they have not yet succeeded. Neither are they likely to, without a revolution in mechanics whereby the tendency of fluids always to seek their own level may be eliminated, and other things as wonderful brought to pass. So long as knowledge remains nearly static, so long will it behoove every house mistress to look well to the usage of her pipes and her traps.



SKETCH OF PLUMBING PLAN FOR MODERN RESIDENCE. LOANED BY INSPECTOR'S OFFICE OF THE CITY OF CHICAGO.

A bit of rag or even string, a burnt match, a wisp of hair seems a very little thing—one that the pipes can carry off with no possible hurt. But the rag, by hanging over the bend of the rap. may serve as a siphon to take away the water seal, which is all that stands between the household and unlimited sewer gas. And the rag may keep on doing it for weeks and weeks, until deadly disease is rampant. A string snarled and twisted may work the same ill. The match ends of course ought to float away harmless, but are very much likelier to be caught in some eddy of the flush water jammed into a crevice, and there to take to themselves other solid particles until they form a decaying clot, both offensive and dangerous. As for hair, there is no end to the harm it harbors. A wisp quickly forms into a sort of strainer, catching and holding all that passes. Aside from that it has a trick of lodging in the most inconvenient places, catching upon the least roughness inside the pipe and staying there until by accretion it has clogged in the whole space. Hair has special affinity for bits of soap. Solid soap. by the way, should never be sent down the pipes. Very soft sop suds even are objectionable, unless you follow it with a flood of clean water, preferably hot water.

Coffee grounds and tea leaves either clog a pipe very soon or else, if the flush water prevents that. wear it through quickly, partly by mechanical action. partly by chemical. Neither should ever be permitted in a sink. Even if you are wise enough to keep out all grease, and thus make sure that the grounds shall get safe away from your own pipes, in the sewer they may come in contact

with grease from pipes less carefully kept and cake and clog your whole pipe system, making necessary costly and inconvenient unclogging.

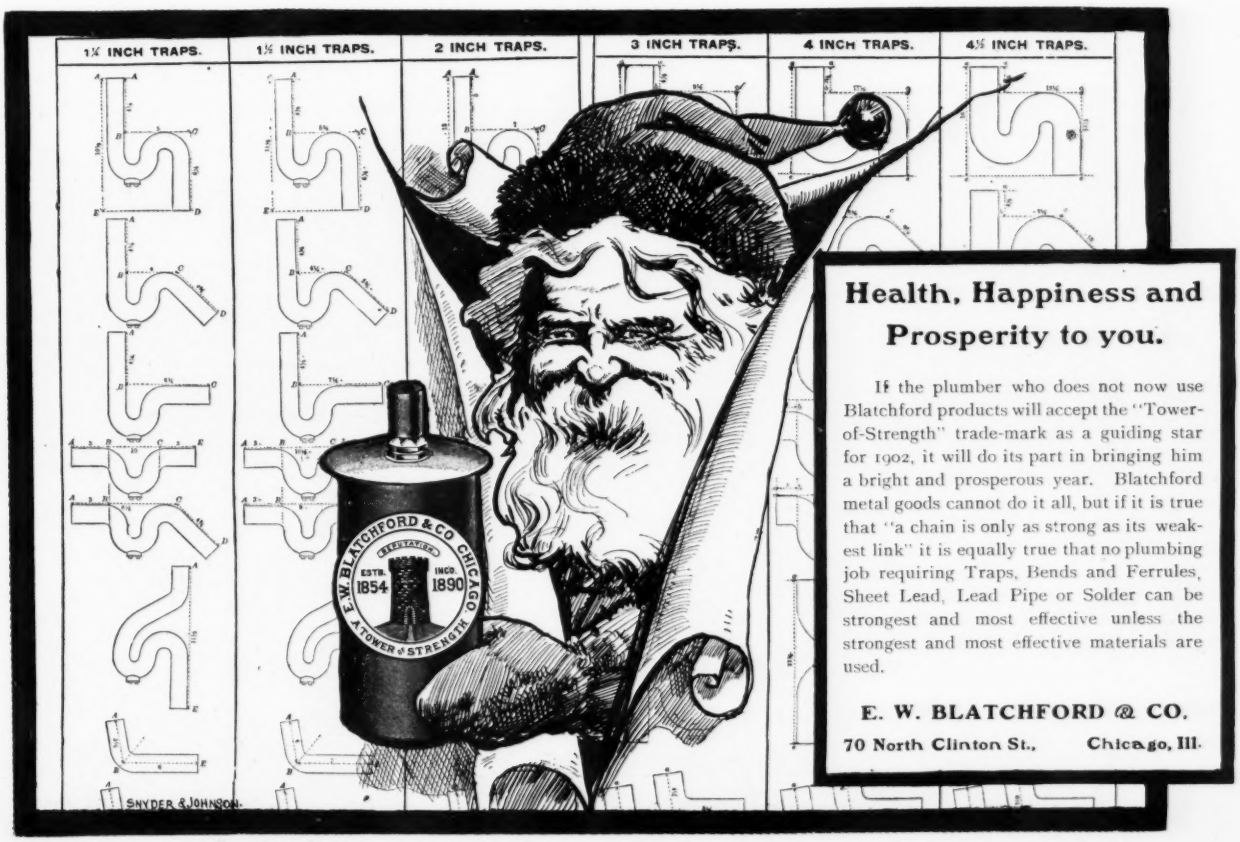
Every kitchen ought to have its grease can, emptied once a week in winter, in summer every three days. All sorts of refuse fat should go into it—even the scrapings from plates and dishes Greasy water. as from boiled hams or corned beef. should be allowed to cool thoroughly, then have the grease carefully taken off before it goes down the pipes. Skillets and frying-pans ought to be filled with very hot soda water and let stand half an hour before washing. This gives time for the soda to partly saponify the grease and keep it from sticking to the pipe or caking on top of the trap.

Every closet in daily use should be flushed once a week with at least two gallons of boiling water. Every other week it ought to have a gallon of copperas water poured into it. and alternate weeks a gallon of chloride of lime solution. Use plain lime water, if nothing else is at hand. Then monthly. but no oftener, dissolve a pound of washing soda in a gallon boiling water, pour it into the closet, let it stand fifteen minutes, then flush the closet from its own cistern, and follow the flushing with a gallon of clear hot water. The soda water should stand in the trap just long enough to clean the sides, and be washed away and rinsed after, so that it may not attack and eat the lead and solder of pipes and joints.

Treat sinks the same way, only use the soda fortnightly and let it stand longer in the trap. But always wash it out thoroughly. Plain lime water is better for a sink than the chloride, which smells to heaven, especially in a small room. For cleaning the traps beneath set bowls use the soda solution with a half pint of ammonia to the gallon.

In scouring faucets, be careful to keep the scouring grit out of the joints. Even the finest particles quickly cut away screw threads turning many times a day. After scouring also take care to let the water run at least a minute before catching any for use. In washing sandy vegetables, as spinach, turnips, potatoes, use a big pan and drain off the dirty water, so the sand may be caught and supplied separate. Even a spoonful of sand going down a pipe will cut and wear it more than a hogshead of water.

Milky water is one of the hardest things to manage. Even a small quantity daily fouls pipes and sets up a most evil smell, unless the milky water is followed by a flushing of soda water moderately strong, with a lime-water flush about every three days. The lime water is made more effective by adding salt to it. Sea salt is best. Put a lump as big as the fist in an earthen or wooden vessel, along with twice a bulk of quicklime, and cover with four gallons of hot water. Stir well and let it settle. Pour the clear liquid down the pipes and follow it in half an hour with a flush of clear water boiling hot. Thus every kind of a sink may be kept sweet and fresh.


1¼ INCH TRAPS.
1½ INCH TRAPS.
2 INCH TRAPS.
3 INCH TRAPS.
4 INCH TRAPS.
4½ INCH TRAPS.
E.W. BLATCHFORD & CO. CHICAGO
ESTABLISHED
ESTB. 1854
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A TOWER of STRENGTH
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Health, Happiness and Prosperity to you.
If the plumber who does not now use Blatchford products will accept the "Tower-of-Strength" trade-mark as a guiding star for 1902, it will do its part in bringing him a bright and prosperous year. Blatchford metal goods cannot do it all, but if it is true that "a chain is only as strong as its weakest link" it is equally true that no plumbing job requiring Traps, Bends and Ferrules, Sheet Lead, Lead Pipe or Solder can be strongest and most effective unless the strongest and most effective materials are used.
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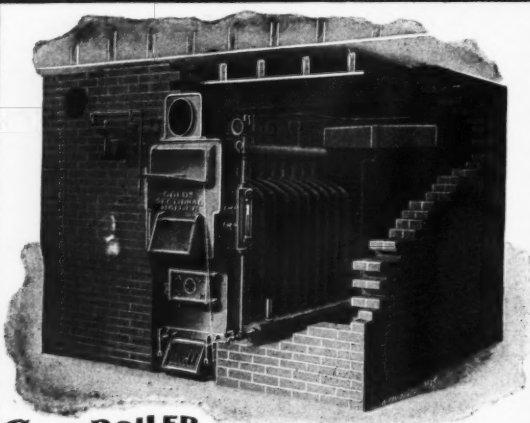
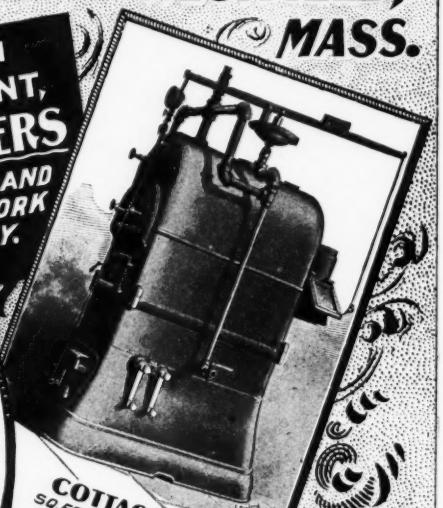


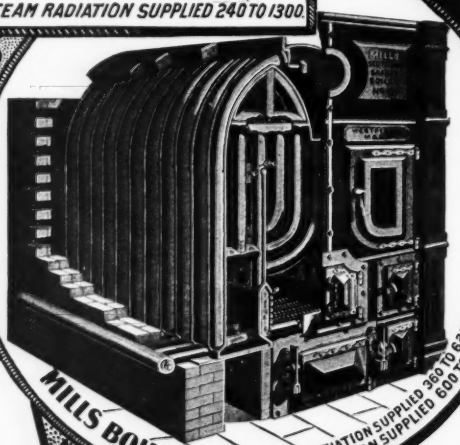
GOLD BOILER,
SQ. FEET STEAM RADIATION SUPPLIED 240 TO 1300.

EUROPEAN AGENT,
AUG. EGGERS
BREMEN AND NEW YORK CITY.

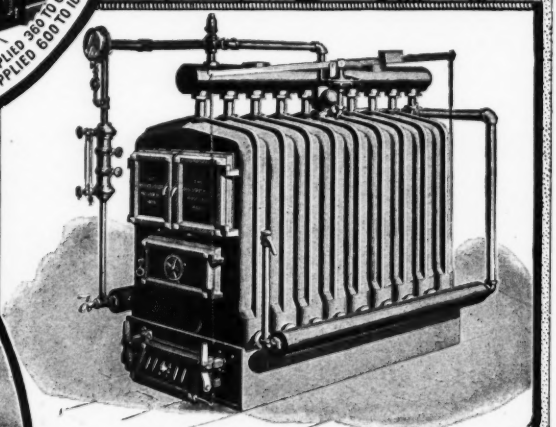


COTTAGE BOILER,
SQ. FEET STEAM RADIATION SUPPLIED 100 TO 550.

PACIFIC COAST AGENTS,
DUGAN BRO'S.
SAN FRANCISCO CAL.



MILLS BOILER, SQ. FEET STEAM RADIATION SUPPLIED 360 TO 6250.
SQ. FEET WATER RADIATION SUPPLIED 600 TO 10400.



MERCER BOILER,
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COTTAGE BOILER,
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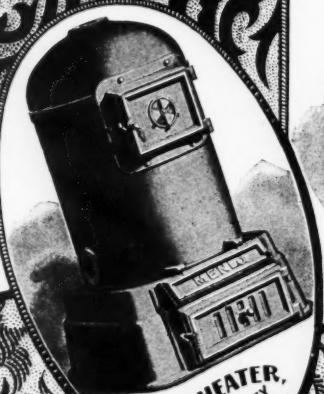

MENLO HEATER,
TANK CAPACITY
100 TO 180 GALLONS.

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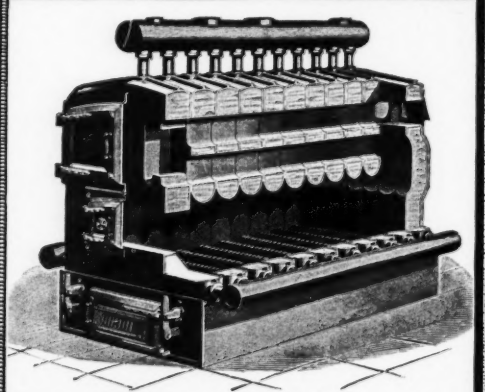

MERCER BOILER,
SQ. FEET WATER RADIATION SUPPLIED 500 TO 5800.

Heating and Ventilation.

A Course of Lectures which, when completed, will cover the theory and practice of those arts.

By Chas. L. Hubbard, of Boston, Mass.

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Copies of issues of Domestic Engineering containing the eight previous installments may be had at 20 cents each.

Part II.—Warm Air Flues.

THE required size of the warm-air flue between the heater and the register, depends first upon the difference in temperature between the air in the flue and that of the room, and second, upon the height of the flue. In dwellings, hospitals, etc., where the conditions are practically constant, it is customary to allow 2 square inches area for each square foot of radiation when the room is on the first floor, and 1½ square inches when it is on the second floor.

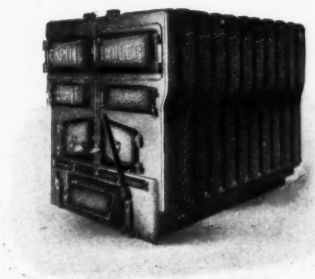
In schoolhouse work it is more usual to calculate the size of flue from an assumed velocity of air flow through it. This will vary greatly according to the outside temperature and the prevailing wind conditions. The following figures may be taken as average velocities obtained in practice, and may be used as a basis for calculating the required flue areas for the different stories of the school building.

1st	floor	280	feet	per minute.
2nd	"	340	"	" "
3rd	"	400	"	" "

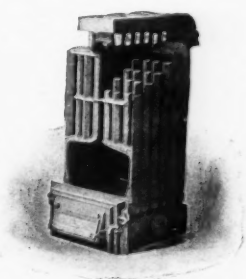
These velocities will be increased somewhat in windy weather and will be reduced when the atmosphere is damp.

Having assumed these velocities, and knowing the num-

"Capitol Boilers"



From 200 to 8,000 feet for steam and from 300 to 13,200 feet for water.



The accompanying illustrations represent a line of BOILERS with a range of capacities.

United States Heater Company

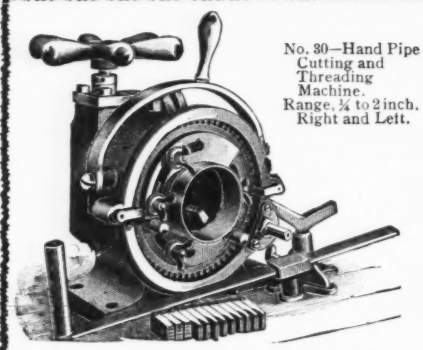
FACTORY AND HOME OFFICE, DETROIT, MICH.

NEW YORK OFFICE 129 Worth St.

CHICAGO OFFICE 52 Dearborn St.

PHILADELPHIA OFFICE 619 Arch St.

Northwestern Sales Agents: Plumbing and Steam Fitting Supplies Co., Minneapolis, Minn.



No. 30—Hand Pipe Cutting and Threading Machine. Range, ¼ to 2 inch. Right and Left.

SAVE TIME AND LABOR. WITH A

FORBES' PATENT DIE STOCK

and one man you can cut off and thread a 12-inch pipe with ease. Smaller sizes proportionately easy.

Ratchet Drills, Ratchet Die Stocks, Malleable Iron Pipe Vises

MANUFACTURED BY

THE CURTIS & CURTIS CO.

18 GARDEN ST., BRIDGEPORT, CONN.

ber of cubic feet of air to be delivered to the room per minute, we have only to divide this quantity by the assumed velocity, to obtain the required flue area in square feet.

Example—A schoolroom on the second floor is to have an air supply of 2,000 cubic feet per minute; what will be the required flue area?

$$2000 \div 340 = 5.8 + \text{sq. feet Ans.}$$

The velocities would be higher in the coldest weather and dampers should be placed in the flues for throttling the air supply when necessary.

Warm Air Flues.

The cold-air ducts supplying heaters should be planned in a similar manner to that described for furnace heating. The air inlet should be on the north or west side of the building, but this course is not always possible. The

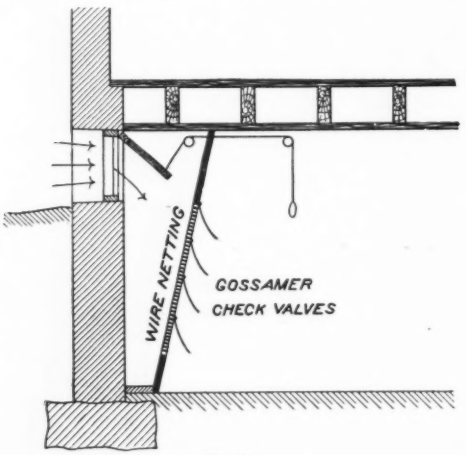


Fig. 13.

method of having a large trunk line or duct with inlets on two or more sides of the building should be carried out when possible. A cold-air room with large inlet windows, and ducts connecting with the heaters make a good arrangement for schoolhouse work. The inlet windows in this case should be provided with check valves to prevent any outward flow of air. A detail of this arrangement is shown in Fig. 13.

This consists of a boxing around the window, extending from the floor to the ceiling. The front is sloped as shown and is closed from the ceiling to a point below the bottom of the window. The remainder is open and covered with a wire netting of about ½ inch mesh; to this are fastened flaps or checks of gossamer cloth about 6 inches in width. These are hemmed on both edges and a

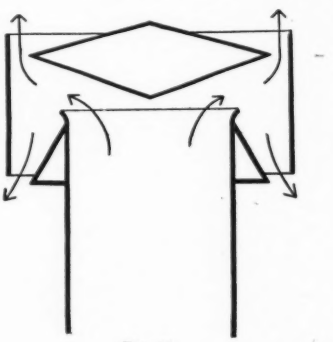


Fig. 14.

stout wire is run through the upper hem which is fastened to the netting by means of small copper or soft iron wire. The checks allow the air to flow inward but close when there is any tendency for the current to reverse.

The area of the cold-air duct for any heater should be about three-fourths the total area of the warm air ducts leading from it.

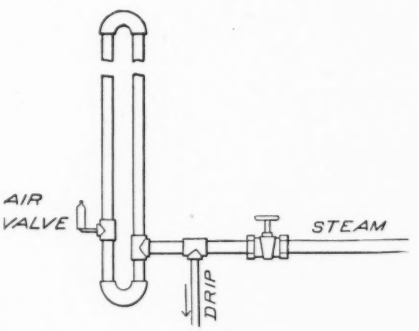


Fig. 15.

A common rule for dwelling houses and similar work is to allow 1½ square inches of area for each square foot of radiating surface. The inlet windows should be provided with some form of damper or slide; outside of which should be placed a wire grating, backed by a netting of about ⅜ inch mesh.

Vent Flues.

In dwelling houses vent flues are often omitted and the frequent opening of doors and leakage are depended upon to carry away the impure air. A well designed system of warming should provide some means for discharge ventilation, especially for bath and toilet rooms, and also for living rooms where lights are burned in the evening. The sizes of flues may be made the reverse of the warm-air flues, that is 1½ square inches area per square foot of indirect radiation for rooms on the first floor and 2 square inches for those on the second floor. This is because the

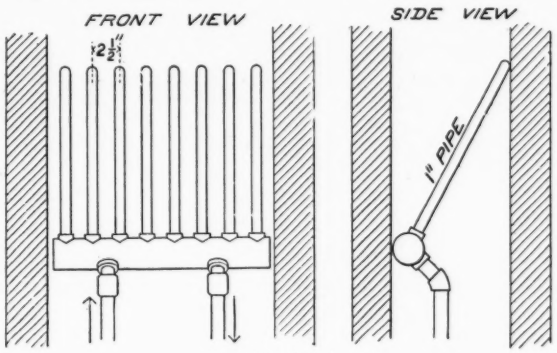


Fig. 16.

velocity of flow will depend upon the height of flue and will therefore be greater from the first floor. The flues should be joined together in the attic and then carried through the roof where a ventilating hood should be provided, especially designed to keep out the rain and snow. A good form is shown in Fig. 14.

Very good results may be obtained by simply letting the flues open into an unfinished attic and depending upon leakage through the roof to carry away the foul air. The flow of air through the vents will be slow at best unless some means is provided for warming the air in the flue to a temperature above that of the room with which it connects. This may be done by carrying up a loop of

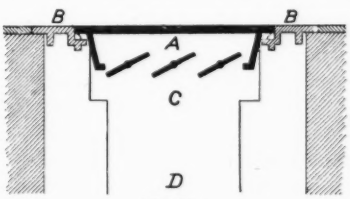


Fig. 17.

steam pipe inside of the flue. It should be connected for drainage and air venting as shown in Fig 15.

For schoolhouse work we may assume average velocities through the vent flues as follows:

1st floor 340 feet per min.
2nd " 280 " " "
3rd " 220 " " "

Where flue sizes are based on these velocities it is well to guard against down drafts by pacing an aspirating coil in the flue. A single row of pipes across the flue as shown in Fig. 16 is usually sufficient for this purpose. The slant height of the heater should be about twice the depth of the flue so that the area between the pipes shall equal the free area of the flue.

Large vent flues of this kind should always be provided with dampers for closing at night and for regulation during strong winds. Sometimes it is desired to move a given quantity of air through a flue which is already in place.

TABLE I.

Height of Flue in Feet.	Excess of Temperature of Air in Flue above that of External Air.					
	5°	10°	15°	20°	30°	50°
5	55	76	94	109	134	167
10	77	108	133	153	188	242
15	94	133	162	188	230	297
20	108	153	188	217	265	342
25	121	171	210	242	297	383
30	133	188	230	265	325	419
35	143	203	248	286	351	453
40	153	217	265	306	375	484
45	162	230	282	325	398	514
50	171	242	297	342	419	541
60	188	264	325	373	461	594

Table I shows what velocities may be obtained through flues of different heights for varying differences in temperature between the outside air and that of the flue.

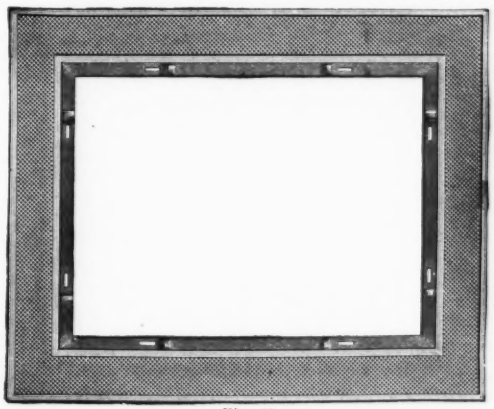


Fig. 18.

Example—It is desired to discharge 1,300 cupic feet of air per minute through a flue having an area of 4 square

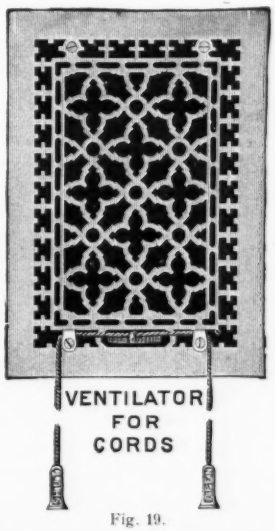


Fig. 19.

feet and a height of 30 feet. If the efficiency of an aspirating coil is 400 B. T. U. how many square feet of surface will be required to move this amount of air when

the temperature of the room is 70 degrees and the outside temperature is 60 degrees?

1300 ÷ 4 = 325 feet per minute = velocity through the flue. Looking in ttable 1 and following along the line opposite a 30-foot flue we find that to obtain this velocity there must be a difference of 30 degrees between the air in the flue and the external air. If the outside temperature is 60 degrees then the air in the flue must be raised to 60 + 30 = 90 degrees. The air of the room being at

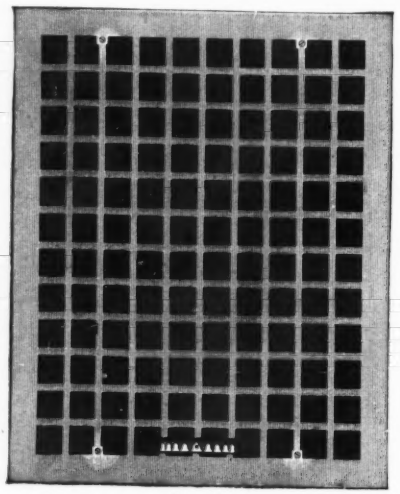


Fig. 20.

70 degrees, a rise of 20 degrees is necessary, so the problem resolves itself into the following—What amount of heating surface, having an efficiency of 400 B. T. U. is necessary to raise 1300 cubic feet of air per minute through 20 degrees?

1300 cubic feet per minute = 1300 × 60 = 78,000 per hour, and making use of our formula for "heat for ventilation," we have

$$\frac{78{,}000 \times 20}{55} = 28{,}363 \text{ B. T. U.},$$

and this divided by 400 = 71 feet of heating surface required.

Registers.

Registers are made of cast iron and bronze, in a great variety of sizes and patterns. The universal finish for cast iron is black "Japan;" they are also finished in colors and electroplated with copper and nickle. Fig. 17 shows a section through a floor register in which "A" represents the valves, which may be turned in a vertical or horizontal position, thus opening or closing the register; "B" is the iron border, "C" the register box of tin or galvanized iron and "D" the warm-air pipe. Floor registers are usually set in cast iron borders, on of which is shown in Fig 18, while wall registers may be screwed directly to wooden borders or frames to correspond with the finish of the room. Wall registers should be provided with pull cords for opening and closing from the floor; these are shown in Fig. 19. The plain lattice pattern shown in Fig. 20 is the best for schoolhouse work as it has a comparatively free opening for air flow and is pleasing and simple in design. More elaborate patterns are used for fine dwelling-house work. Registers with shut-off valves are used for air inlets in the vent openings. The vent flues are usually gathered together in the attic and a single damper may be used to shut off the whole number at once. Flat or round wire gratings of open pattern are often used in place of register faces. The grill or solid part of a register face usually takes up about $\frac{1}{3}$ of the area, hence in computing the size we must allow for this by multiplying the required "net area" by 1.5 to obtain the "total" or "over all" area.

For example, suppose we have a flue 10 inches in width and wish to use a register having a free area of 200 square inches, what will be the required height of the register? 200 × 1.5 = 300 square inches which is the total area required, then 300 ÷ 10 = 30, which is the required height and we should use a 10" × 30" register. When a register is spoken of as a 10" × 30" or 10" × 20", etc. the dimensions of the latticed opening is meant, and not the outside dimensions of the whole register. The free opening should have the same area as the flue with which it

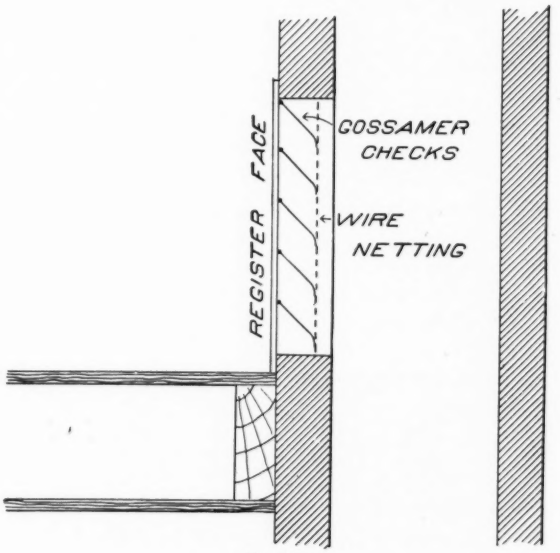


Fig. 21.

connects. In designing new work one should provide himself with a trade catalogue, and use only standard sizes as special patterns and sizes are costly. Fig. 21 shows the method of placing gossamer check valves back of the vent register faces to prevent down drafts, the same as described for fresh-air inlets.

The Heating and Ventilation of the Edward Wyman School, St. Louis, Mo.

Paper read before the American Society of Heating and Ventilating Engineers by A. N. Reed, Member of the Society.

PROPER heating and ventilating of modern schools is a matter of more than ordinary importance as is well known to all members of this society, and as there are in schoolhouses many special features of great importance in the construction of the building, such as the arrangement of rooms and wardrobes, light, stairways, etc., which prevent the planning and erection of an ideal system, the designer is frequently called upon to exercise considerable ingenuity in planning a system which, when completed, will not only give entire satisfaction to his clients, but be entirely satisfactory to himself.

It has been my custom to keep in very close touch with the draughting room when the planning of a new school or the reconstruction of an old building is commenced, and in fact the matter of heating and ventilating is always kept in mind in all stages of the work. By this method a much better system is planned than if no attention was given the heating and ventilating until all plans were finished.

In new buildings, and when old buildings are to be reconstructed, arrangements are made to heat and ventilate by the low-pressure steam and fan system. By low pressure I mean that not more than fifteen pounds of steam is carried on the boiler, and lower pressure maintained on the heating system through reducing valves.

One of our latest buildings is the Edward Wyman school, two stories high, the greater part of the basement floor being above the grade level. This building contains eighteen class-rooms, a kindergarten and lecture-room (each equal to two class-rooms in area), a library, principal's office, teachers' toilet rooms, etc.

Each class-room is supplied with ample wardrobe room, arranged to receive outside light. The wardrobes differ from those of the ordinary school building, inasmuch as they open off the room only, having no communication with the corridors.

In the basement are the boiler and coal rooms, the engine and fan room, the latrine rooms and play rooms.

The building is of fireproof construction throughout. It is designed after the early English style, and the feeling has been admirably maintained by the use of a mottled brick with heavy grey joints. The building is finished in hardwood throughout, and the walls and ceilings are painted in lead and oil in pleasing and harmonious colors.

The total cost of finishing the building was 126,752 dollars; cost of heating and ventilating only 10,687 dollars.

The heating and ventilating plant consists of one horizontal tubular boiler, 72 inches diameter, 22 feet long, containing twenty-six 6-in. flues. The engine has a cylinder 18 inches in diameter, by 12-inch. stroke, direct-connected to the shaft of a fan wheel 11 inches in diameter by 5 feet 6 inches wide, and which is somewhat different from the general style of double discharge fans.

It has been designed to give an even flow of air over the entire surface of the coils, and a delivery will be required of 68,400 cubic feet of air per minute in order to fulfil the guarantee. The heating of the air is accomplished by 12 coils, two being used as tempering coils and five in each heater stack. Each has four rows of 1-inch pipes, spaced $3\frac{1}{8}$ inches, center to center lengthwise of the coil, and the rows are spaced $2\frac{1}{2}$ inches, center to center. The pipes are 7 feet high, each coil having 1,022 feet of 1-inch pipe, and the twelve coils have 12,264 feet of 1-inch pipe.

The base of this coil has been designed with a view to causing the steam and the water of condensation to flow in the same direction in the base, and with a water seal of $1\frac{1}{2}$ inches at the rear end and a current of steam upward in two of the rows of pipe and downard, as it were, in the other two rows.

During the past winter a test of the coils proved that they do not air-bind. The water of condensation is drained out of the bottom of the base, giving a dry base at all times, and is returned by gravity to a receiver, whence it is pumped to the boiler.

At this school the air is drawn down through two towers at each side of the main entrance, thence through a passageway, when it passes either through or beneath the tempering coils. Under each of the tempering coils is placed a by-pass door, which is caused to be opened or closed by a thermostat placed in the tempered air room to keep the temperature of the air when it enters the fan at 70 degrees.

The air is then discharged from either end of the fan, either through or beneath the heating coils, into the hot room or the tempered air room, and thence into galvanized ducts, hung near the ceiling, leading to each class-room.

All class-rooms have double connections at the plenum chamber, and the double dampers are controlled by thermostats placed in each of the class-rooms. The ducts leading to the classrooms have an area of 2 square feet, the vertical flues an area of 3 square feet, and the openings into the class-rooms an area of 5 square feet.

A diffuser is used on all fresh-air openings into the class-rooms. These openings are located about nine feet above the floor and, wherever possible in the planning of the building, arrangements are made to discharge the air toward the outer walls and glass surfaces; but, as was mentioned early in this paper, this cannot always be done; and under these circumstances, a diffuser is found to be of great value in directing the air toward the outer, and, therefore, colder, parts of the room. All vent registers have an area of 5 square feet each, and are in the wardrobes, at or near the floor level. This is found to give very excellent service.

The wraps of the children are hung on long hooks which prevent them from touching the walls; the air passing through and around the clothing insures that it will be dry when wanted for recess or at dismissal. This is especially advantageous should the children have been in the rain or snow on their way to school.

The vent flues lead to the attic, where the air is dis-

charged to the outside through towers. Beneath these towers are usually placed two or more doors which are opened or closed by air pressure, controlled by a small three-way valve in the engine room.

This method of opening and closing the doors in the attic has its merits; ropes, chains, and pulleys will get out of working order, and under these circumstances it would be necessary that the janitor should climb the stairs to the attic. This he might "forget," but with only a small three-way cock to open or close I have never found this duty neglected.

A by-pass for the whole heating system is provided. At the point where the fresh air enters the basement from the towers is a door which is closed, and another door, over the tempering coils, connecting with the first floor hall, is opened. The class-room doors are left open. When the fan is started, a complete circulation of the air in the building is at once established. Not only is this found to be a very economical system of heating the building early in the morning, or at other times when not occupied for school purposes, but the work is accomplished very quickly.

A special form of header was designed for the steam connections to the coils in order to reduce the number of joints and, consequently, the liability of leaks. Formerly this header was constructed of valves and fittings too numerous to mention, with all their numerous "kinks and twists," in order to get them to "come right." The advantages of a simple header can be easily seen.

The heating of the halls and corridors, as well as of the entire basement, is accomplished by hot air; no direct radiation is used.

The sides of the fan housing, the casings of the coils and the sides of the hot air and tempered air rooms are painted and finished in white enamel, as well as the engines, pumps, etc. The pipes, when covered, are painted white; the walls and ceilings are also painted white. All these, when finished, as described, gives an idea of not only a useful apparatus, but one interesting and beautiful.

The latrines and sanitaries are an important part of the fitting up of a modern schoolhouse. Each of the closets shown has a local vent of 7 square inches, connected to an underground duct leading to the space around the cast-iron stack. The urinal stalls are also ventilated in the same manner, each stall being separately ventilated into the underground duct.

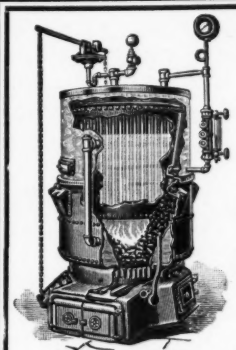
We have a special arrangement for keeping a fire in the stack in warm weather when there is no fire in the boiler, insuring perfect ventilation at all times.

Fan Efficiencies.

A short time ago our contemporary, "The Engineer," published an account of a new fan known as the "Sirrocco." The claims of efficiency made for the fan in that article have drawn out a voluminous correspondence on fan efficiencies, and the situation is summed up editorially as follows by our contemporary named:

"Some weeks ago we reported on the performance of a Davidson fan, employed in the much-needed work of ventilation at the Law Courts. What we said will be found in 'The Engineer' for April 12 last. The publication of the article in question was followed by the receipt of a somewhat voluminous correspondence, which has appeared week by week in our columns. As one writer has pertinently pointed out, this is the third or fourth discussion concerning the merits and demerits of fans that has appeared in our pages. These appear to be invariably barren of results; and the object of this article is to set forth why, in our opinion, these discussions arise, and why, in the main, they lead to nothing. To us the explanation appears very simple. People dispute about fan efficiency without having arrived at any uniform standard by which to measure it. If each of our correspondents used a rule of a different length to settle the diameter, width and dimensions in general of a fan they would naturally arrive at different conclusions. The efficiency of fans is measured by different standards of comparison, and the result is, in its way, just as misleading as would be the use of rules as we have indicated which did not agree as to the length of an inch and a foot. So far as we are aware, there is nothing new in all this; it has always been so, within our experience. Mathematicians have dealt very fully with the theory of fans; but neither the maker nor the purchaser cares in the least for what the mathematician has to say, and this simply because the rules of construction laid down by the mathematician cannot be applied in practice, or, being applied, do not produce the results foretold. Air has, indeed, an unfortunate predilection for doing that which was not anticipated; and there is excellent reason to believe that the best proportions for fans of all kinds have been ascertained by a tedious process of trial and error, and are the embodiment of pure empiricism rather than the result of mathematical deduction. In a word, mathematics will not help us at all in arriving at a decision on the merits and demerits of any particular type of fan. Nothing, in short, will take the place of actual results obtained in practice. That is to say, it is useless to assert that an fan is theoretically wrong, while the maker has more orders on his books for it than he can satisfy; or that a fan is theoretically right, while it is being discarded after trial by various users.

"In trying to arrive at some standard of efficiency, it is perhaps well to reject the mode of estimation which goes no further than an expression of satisfaction with a result. A certain colliery, for example, is supplied with a new fan. The result is excellent ventilation. Everyone is pleased. The fan was supplied to move a given number of cubic feet of air in an hour, and it does this and a good deal more. Nothing, however is said about the cost in power. Our correspondents are not, and very properly are not, content with such definitions of efficiency at this. The main point, though not the only point, at issue appears to be the horse-power required to perform a given amount of work. So far they agree. But the moment an attempt is made to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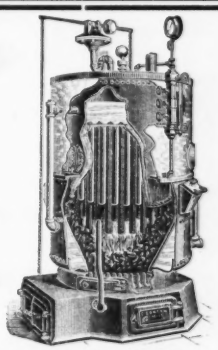

Soft Coal Boiler

measure or define the work, issue is joined. Far be it from us to side with any one of several parties to this dispute. Our purpose is to direct attention to facts which are overlooked by our correspondents. Thus, one standard is the number of cubic feet of air moved at a given velocity per unit of time. Apparently this is very simple. We have a pound or a ton of air moving at a given speed. It has acquired that speed from the fan. The energy or vis viva stored in the moving air represents so much work done in a unit of time. This is easily reduced to terms of horse-power. The engine driving the fan is indicated. A rule-of-three sum gives us the percentage of the whole power exerted in moving the air, and, consequently, the efficiency of the fan. All this seems plain enough, but it is quite misleading, or, at all events, the method may lead to endless discussion. At the very outset we are met by the question. What is the velocity of the air? or, to be more precise, of its many velocities which are we to select? Any figures will do to illustrate our meaning. A given fan is delivering air with a velocity measured at the throat of an evasee chimney of 50 feet per second. The stored work in every pounds of the air is $\frac{50 \times 50}{64.4} = 38.3$ foot-pounds. So far so well. But now, instead of measuring the velocity at the throat of the chimney, let us measure it at the mouth, where the sectional area is double that at the throat. Here the air is moving at 25 feet per second, and the stored energy in each pound of air is only 9.575 foot-pounds per pound, or one-fourth of the former quantity. What has become of the difference? Nothing is more easy than to say that it has disappeared in effecting the expansion of the air. Inasmuch, however, as the air is, according to all authorities, more dense at the mouth of the chimney than it is at the throat, this explanation is, to say the least, open to objections. Be the dissipation of energy due to what cause soever we think good to assign it, the fact still remains that no one has ever actually measured the forces causing the waste, nor, indeed, does it seem to be possible to measure them. If what we have written has been understood, it will be seen that to estimate the efficiency of a fan by the velocity of the air in a tube may introduce gigantic errors. Aware of this, some persons would take the velocity of the air at the tips of the fan blades. We do not hesitate to say that it is impossible to ascertain the velocity of air at this point all round the fan with accuracy. Others take the velocity in a given drift or air way in a mine. But it will readily be understood, we think, that this method may be thoroughly misleading. The fact on which we wish to insist is that any error introduced by mistaking the velocity of the air, or by measuring that velocity in the wrong place, varies in amount, not as the velocity, but as the square of the velocity. To make this yet clearer, it may perhaps suffice to say that if a given velocity represents 100 indicated horse-power, one-half that velocity represents but 25 indicated horse-power, and so on. But there is another factor to be considered, to which sufficient importance is not, as a rule, attached. Fans have not only to deliver air, but they have to inhale it, and not infrequently this has to be done through tortuous passages, involving the formation of eddies and other absorbers of energy. It is almost impossible to estimate the work which may be lost in this way, the general result being a reduction in the volume or weight of air delivered.

"Considerations of this kind establish a doubt as to whether the proper measure of fan efficiency is the weight of air moved per minute and its velocity. Not that the standard is in itself wrong, but that it is extremely difficult to apply it fairly when a comparison is being drawn between two fans. A given fan may be discarded, and first one fan which we shall call A, and then another which we shall call B, is tried. The first doubles the weight of air delivered per minute, the velocity of the air remaining the same. An effect easily produced, say, merely by enlarging various dimensions. The fan B also doubles the quantity of air delivered, but it does so by doubling the velocity of the air. The power required to work A will be double, let us say, that used by the discarded fan, while that used by B will actually be eight times as much. How misleading velocity may be is very clearly seen, we think, from this example. Furthermore, it must not be forgotten that to estimate the efficiency of a fan in terms of the velociy of the air moved and its weight is a somewhat recondite method of going to work. Indicator cards cannot tell us anything of the power stored in the moving air. Probably the most satisfactory method of arriving at a just appreciation of the value of two types of fan is simply to take the actual volume of air transferred from one place to another per minute, without regard to its velocity, and then to ascertain the torque or angular resistance of the fan. It is clear that a fan can do work without any transfer of air whatever, and that the air even in a closed fan case will offer more or less resistance to the rotation of the

blades. After all, the true measures of the work done is the resistance which the air offers to the rotation of the fan blades. It is in overcoming this resistance that power is expended. That energy is stored up in the air is purely an incident—an accidental and inconvenient concatenation of cause and effect in which no one is interested, since all the stored energy in the air is wasted. A fan is not used to accumulate energy in air, but only to move air from one place to another. The work done by a locomotive is not determined in terms of the momentum of the train, but of the speed and the load on the drawbar. This brings us down to the exceedingly simple statement that, other things being equal, that fan is the best which moves a given volume of air per minute, out of, say, a coal mine or a building, with the lowest average pressure on the piston. We need not, we think, stop to explain that if the torque of the fan pulley and the belt speed in feet per minute are known, nothing is easier than to determine the precise horse-power expended by the fan. The measurement with accuracy of the volume of air moved is much more difficult; but we venture to think that it is not beyond the resources of science."

Water-Tube Boiler Connections.

ONE of the most important features in water-tube boiler design is the manner in which the tubes are connected to the collectors and water drums, and upon the method of connection employed depends to a great extent the important features of safety, strength, circulation, and ease of assemblage and repair. For this reason a paper by M. C. Walckenaer, in a recent issue of the Revue de Mecanique, demands attention, treating as it does, upon the development of the various methods now in use.

Water-tube boilers, as the name implies, consists mainly of assemblages of tubes filled with water and exposed to the action of fire and heated gases. In them the steam is generated, and every facility should be provided for the escape of the steam to the point where it is delivered for use, equal facility being given to the access of water. It is evident that connections for tubes for such service have to fulfil severe requirements. The joints are many and close together, and commercial economy demands that the cost shall not be great. Steam pressures are creeping steadily upward, and 250 pounds per square inch is a not uncommon requirement, while at the same time rapid firing and sudden demands for steam make expansion and contraction strains frequent and severe. The necessity for prompt and convenient replacement of burst or leaky tubes demands a joint which can be easily broken and remade, and, what is still more difficult, will be as tight as ever when re-made. All these requirements must be met, not only when the work is done in the works of the maker by skilled mechanics using special tools, but also, and frequently, in the stokehold of a vessel, many miles from port and with such help as can be obtained under such conditions, or, even in the midst of battle at a time when the fate of the engagement or the vessel may depend upon the promptness with which the joint can be handled.

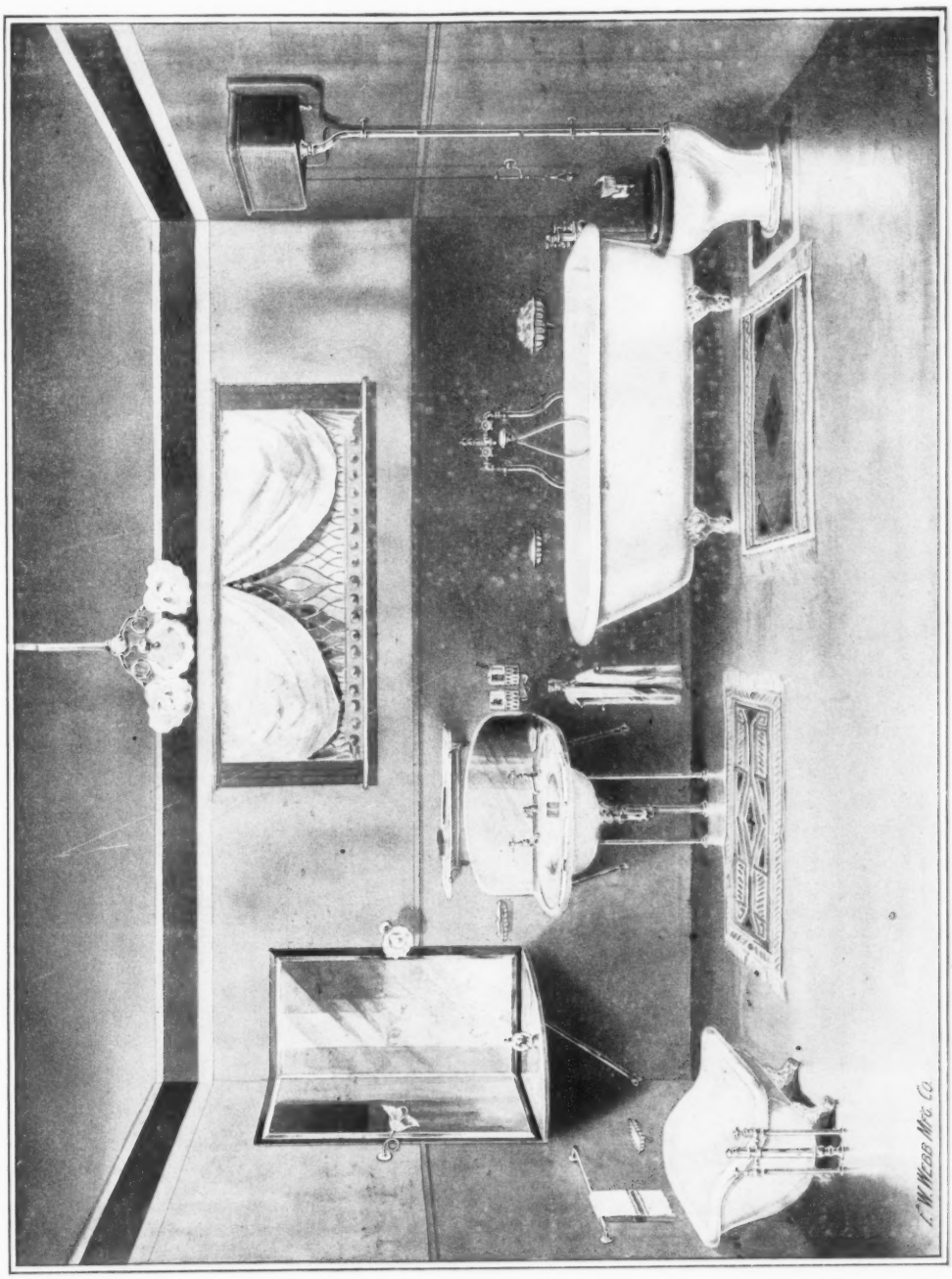
M. Walckenaer begins with the Collet joint, a predecessor of the Niclausse system, this being a concentric tube system in which a taper joint was made between the front end of the tube and the collector by means of a long through-bolt, this bolt also serving to make the connection for the caps at each end, and apparently suggested by the similar bolts used long before on the Harrison system of cast-iron spheres. This was subsequently replaced by a short bolt engaging with sockets in the forward end of the tube, the back end being closed entirely, or fitted with a screwed cap.

The desirability of providing for the withdrawal of the tubes from the front, however, caused this arrangement to be reversed in the present form of the Niclausse boiler, and the sleeves are now forced in from the front, one yoke and bolt serving for two adjacent sets of tubes. In this design the tubes were originally attached to the sleeves by a screw joint, but there have been several accidents due to the separation at the screwed joint, and in the latest pattern the sleeve, with the two conical join-surfaces, is formed in one piece with the seamless tube. The rear end of the Niclausse tube is closed by a screwed cap, but as this joint is not exposed to the action of the fire, no difficulty is apprehended at that point and no failures have been reported.

The above methods all relate to boilers having tubes connected to the collectors at but one end, and provided with internal circulating tubes on the Field principle, and they are manifestly unsuited for tubes connected at both ends. The Belleville boiler, one of the oldest in this matter, M. Belleville having been experimenting since 1856, uses screwed joints, the steel connecting boxes being fitted with a thread of 2.5 mm. pitch, while the screw-thread on the tubes is 2.54 mm. pitch, this slight difference in pitch insuring a tight joint. A back nut is also used on the tube, red lead being applied before screwing up. This sort of a joint is difficult to disconnect after having once been properly made up, and in the Belleville boiler it is customary to remove an entire element and replace it with a new one, when any tube reveals defects. If a single tube must be replaced the back nut is usually cut off, and even then the tight differential joint is sometimes hard to disconnect.

Expanded joints are generally used in the small-tube express boilers, and also in some of the large-tube boilers such as the Babcock & Wilcox, De Naeyer, and others. These joints, made by expanding the ends of the tubes by the use of a roller expanding tool until a shoulder is formed against the metal of the collector or header, have long been employed in the construction of multitubular "tank" boilers, and although they do not meet with the full approval of M. Walckenaer they appear to be the most practical form at present in use, although something better is undoubtedly to be desired. Single tubes can be cut out and new ones expanded into the same holes, and if the work is intelligently done the new job will be as good as the old one.

M. Walckenaer discusses the various forms of joints used for caps, and his paper is a thorough resume of this most important detail of water-tube boiler design, and it is to be hoped that it will stimulate steam engineers to effect further improvements in a ripe field. *Engineering Magazine*



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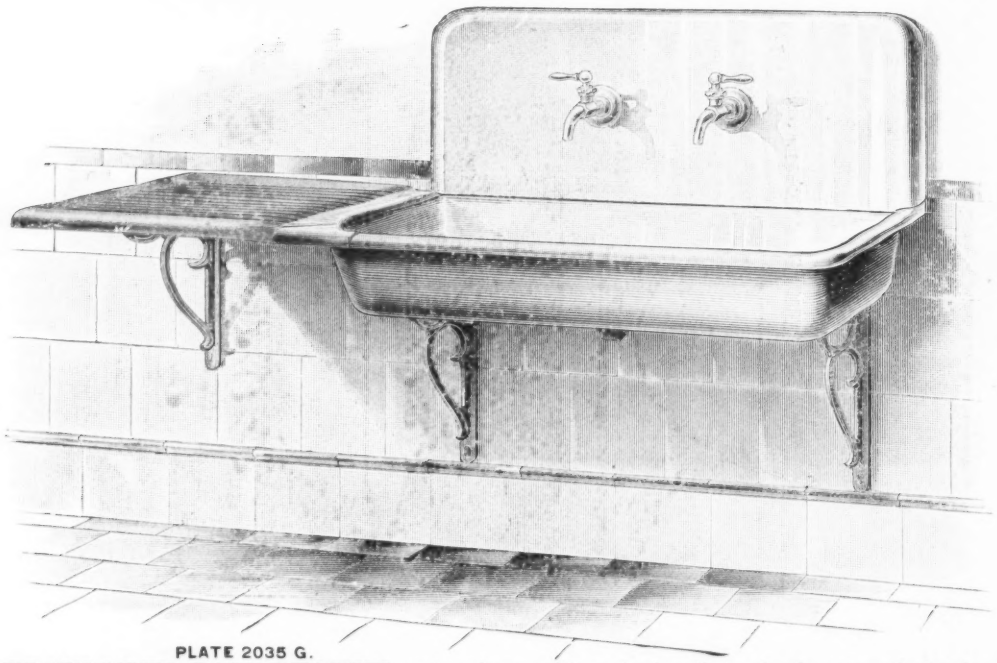

PLATE 2035 G.

PORCELAIN LINED ROLL RIM SINK on brackets, with 15 inch roll rim back, concealed galvanized air chambers, 18 inch Interchangeable Wood Dripboard with Enameled Iron End and Bronzed Iron Bracket and Nickel-plated Brass Faucets. Brackets and Exterior of Sink Bronzed.

Interchangeable Wood Drip-board with Enameled Iron End

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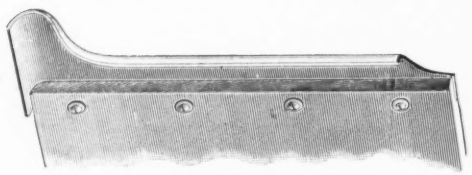
PLATE 2037 G.



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The fact that gas pipe is sold at a pretty stiff price does not seem to prevent its extensive use by holdup men.

Architects Have Bowling Club.

The architects have a club in the New York Bowling League. It is composed of Messrs. P. Dorschel, Nerge, Brown, Heins, and O. Dorschel.

New Catalogue Good One.

Abendroth Brothers' new catalogue of furnaces, ranges, fireplace heaters, etc., is a good one. They are at 109-111 Beekman street.

An Old, Old Timer.

The Haydenville Company, New York City and Haydenville, Mass., manufacturers of Pennie's sewer gas and back water trap, was established in 1845.

This Deserves Attention.

Members of the New York trade are receiving information about an underground pipe covering that is interesting to them. The covering is manufactured by A. Wyckoff & Son Company, Elmira, N. Y.

Have Full Line.

Frank McLain & Co., Fourth avenue, have a full line of Cornell, Cambridge and Oxford steam heaters and Princeton, Humber, Amherst, Yale and Sandow hot water heaters.

Request to the Trade.

All persons who receive a copy of the latest catalogue issued by Merchant & Co., Inc., of Philadelphia, are requested to acknowledge its receipt as a favor to the Merchant company.

Chance for Some Plumber.

Welch, Smith & Provost have filed plans for a $200,000 double dwelling to be built at 5 and 7 East 75th street. William Hall's Sons are owners of the ground and are putting up the building.

Mr. Aldous' Report.

Levi Aldous' who is one of the leading plumbers of Passaic, N. J., reports business as very good in his town. Mr. Aldous also does roofing, makes stoves, repairs, etc. His store is at 48-50 Bloomfield avenue.

C. C. Ball Cock on Exhibition.

The C. C. ball cock, manufactured exclusively by O. H. Jones, Hartford, Conn., is on exhibition at this firm's New York office, 101 Beekman street. A card dropped to that address will bring printed matter. Mention Domestic Engineering.

First Board of Directors.

Frank P. Kelly, C. E. Boughton, William Liddell, W. H. Morland, and V. W. Hadley compose the first board of the recently incorporated Master Plumbers' Association of Binghampton, N. Y.

Abner Company Arrange Exhibition.

The Abner Acetylene Gas Company is arranging to soon have on exhibition at its New York store, 52 Leonard street, a complete display of Abner acetylene gas generators.

Business Changes Hands.

The business formerly controlled by Thomas Ostick, 1327 Third avenue, Brooklyn, is now owned by John R. Lee, who is a plumber known to the trade of Greater New York.

Trade School Catalogue Ready.

The 1901-02 catalogue of the New York Trade School is ready for distribution. New York Trade School, First avenue, Sixty-seventh and Sixty-eighth streets, is the address.

Acme Soil Pipe Clamp.

The Acme Manufacturing Company, 30 Newburn street, Boston, is furnishing New York trade printed matter which tells about a new soil pipe clamp made by the Acme company.

Mr. Oettlin, Brooklyn, Says:

Gus Oettlin, 792 Gates avenue, Brooklyn, reports a good business. Jobs are getting more numerous, he says, and there is now more jobbing work than there has been recently.

Liberty Incandescent Light.

The Liberty Incandescent Light Commany, jobbers and manufacturers of glassware, burners and sundries, are doing business at 215-217 Grand street. Ask them for a catalogue, mentioning Domestic Engineering.

Pennie's Sewer Gas Trap.

Pennie's sewer gas and back water trap, which was patented December 20, 1898, is one of the specialties of the trade that is manufactured exclusively by The Haydenville Company, New York City and Haydenville, Mass.

Mr. Myers Opens Shop.

E. Myers has just opened a new plumbing shop at 23 Goerck street. Mr. Myers says that he is in the business to stay and that he is going to make a name for himself. Domestic Engineering advertisers are requested to supply him with their latest catalogues and printed matter.

Peter Backus & Son Report.

Peter Backus & Son, engineers and steam fitters, 133 and 135 West Twenty-fifth street, report business as very good. They are contractors and jobbers for steam and hot water heating, ventilating apparatus, electrical and general pipe fitting work, etc.

Prices Remaining Stiff.

The prices of plumbing supplies are still pretty stiff and the prospects are that they wil remain so for sometime to come. There still seems to be a scarcity in plumbers' brass goods. One jobber said the other day that it wasn't so much trouble to get consignments of brass goods from manufacturers, but that if anything special was wanted the manufacturer insisted on having his own time to finish the order in.

Johns is Reaching Trade.

A new pamphlet describing the good points of the asbestos fire felt coverings for steam pipes, boilers, etc., manufactured by the H. W. Johns Manufacturing Company, 100 William street, is reaching the trade.

Mr. Harris, Oneida, Reports.

F. D. Harris, 113 Main street, Oneida, N. Y., reports business increasing in his line. He is not only doing considerable plumbing, but is putting a number of the International line of hot water and hot air heaters.

Schwab Brothers Incorporated.

Schwab Brothers, the manufacturers of plumbers' woodwork, on Gold street, have become an incorporated concern, with a capital of $25,000. Paul Schwab, Jersey City; Adolph Schwab, Bayonne, N. J., and T. A. McKennell, Mount Vernon, N. Y., are the incorporators. These three will also be the first board of directors.

Frink Reflectors Get Silver Medal.

I. P. Frink, 551 Pearl street, manufacturer of the Frink reflector, has received a silver medal which was awarded the reflectors bearing his name at the Pan-American. The Frink reflectors are used from one end of the country to the other, in churches, halls, and other places where such things are needed.

Nealson & Farnon Leading Paterson Firm.

Nealson & Farnon are one of the leading firms of Paterson, N. J., in the plumbing and steam heating trades. Their store is at 282 Main street. Their telephone is 447 A. The firm is composed of Matthew Nealson and Thomas Farnon.

Phelps Bros. Have B. & A. Valve.

The well known B & A. combination union elbow for hot water use, the valve which the Blake & Andros, of Boston, are making such a hit with, is sold in New York by Phelps Brothers, manufacturers' agents. Phelps Brothers have offices at 284 and 286 Pearl street.

Olmstead's New Price List.

The new price list of plumbers' cabinet woodwork has been issued by the H. B. Olmstead Company, 87 Frankfort street. Their telephone is 1041 John. This list is something handlers of plumbers' woodwork should have, as it is a very handy little pamphlet.

Old Landmark to Move.

Oscar Schlegel, plumbers' and steam fitters' specialties, who is a landmark of the old town at 224 to 230 Canal street, has picked out a new store and will give up the store where he has been for so many years. He has leased the large store rooms at 182 and 184 Grand street, where he will soon be at home to his friends of the trade.

They Cannot Fall Apart.

The Model adjustable floor and ceiling plates are made by the Codling Manufacturing Company, Bristol, Conn. "They cannot fall apart," is one of the good points their makers claim for them. Why they cannot fall apart will be told if anyone is sufficiently interested in such floor and ceiling plates to mention Domestic Engineering in a line to The Codling Company.

Good Man to Know.

John C. Wickes, manufacturers' agent, now has an agency for a complete line of plumbers' brass goods, cast iron fittings pipe and fittings, plumbers' enameled goods, bath tubs, lavatories, hoppers, traps, etc. Mr. Wickes is one of the late arrivals in this branch of the trade but he is thoroughly acquainted with the trade and what the trade wants. His telephone number is 3943 John.

PROSPECTS FOR PLUMBER IN MEXICO?

A subscriber asks us what the prospects are for a plumber in Mexico. He would like to have the names of some of the more prominent firms and the names of the Mexican cities in which they are. If any of our readers can furnish this information we will be indebted to them. Address DOMESTIC ENGINEERING, 89-91 Center street, New York City.

INTERESTING AT THIS TIME.

There is little difference between the winter and summer coal bills, says the Thayer & Jackson Stationery Company, Chicago, in speaking of its system of heating. The system they use is the Paul system. A word to The Paul System Company, Park Row Building, New York City, will bring a booklet which will tell about the Paul system.

ABENDROTH BROTHERS' CATALOGUE.

Abendroth Brothers, 109-111 Beekman street, have issued a very complete catalogue of their Gem hot water and steam boilers. This firm also makes the Abendroth vertical sectional steam and hot water boilers, which have made such a favorable impression wherever they have been used. Mention DOMESTIC ENGINEERING when writing for a catalogue.

VALUABLE BOOK OF TABLES.

The Benedict & Burnham Manufacturing Company, 253 Broadway, are giving away a valuable little book that should be in the library of every plumber, gas fitter and mechanic. It is a book of tube, sheet and wire tables. This company are manufacturers of the Benedict-Nickel seamless tubing, which is known to every plumber from the Atlantic to the Pacific and used by many of them.

IT HAS BEEN TESTED.

The Tobey steam trap, which is manufactured by The J. L. Mott Iron Works, Beekman street, has been tested under every condition that a trap can be placed, its makers say, and has proven satisfactory in every instance. This trap is simple in construction, they say, and economical in operation. The Mott company is sending out a special catalogue telling of the good qualities of the Tobey trap.

THEY SELL GEMS.

Western Valve Company, Chicago; Crane Company, Philadelphia; Miller & Brockman, St. Louis, and Toledo Supply Company, Toledo, O., are agents for the Gem steam and hot water heaters, which are manufactured by Abendroth Brothers, Port Chester, N. Y. The Gem can be seen at 109 and 111 Beekman street, New York City, and also at salesrooms of this firm at Boston.

WORD ABOUT GOOD ENGRAVINGS.

Some of the best engravings in the last issue of monthly and weekly DOMESTIC ENGINEERING were made by Field & Beattie, 89 Fulton street. This firm makes half tones, wood cuts, line cuts, electrotypes, and everything in that line. Mention DOMESTIC ENGINEERING in a letter to them for further information. Their telephone number is 645 John. A representative or letter will furnish further particulars if a line is dropped to them.

DID YOU MISS THE STUFFING?

One of the neatest holiday cards that has reached the desk of DOMESTIC ENGINEERING is the one sent out by the W. H. Colebrook, Sons & Company, Syracuse, N. Y., manufacturers of asbestos furnace cement and other articles of the trade. It is a plain card, on the back of which is pasted a small paper sack, neatly tied, above which can be seen the feet of a turkey. On one side it says "Don't miss the stuffing." The "stuffing' is a circular which tells about Colebrook goods.

U. S. COMPANY ENLARGING PLANT.

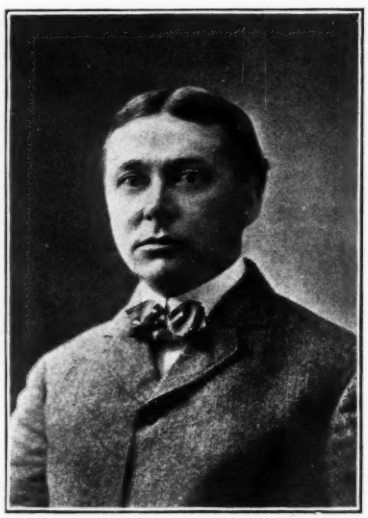
The United States Radiator Company, Park Row Building, New York City, and Dunkirk, N. Y., is soon to have better facalities for manufacturing their well known Triton and Chautauqua radiators. Their already large plant is to be made still larger. Work has been begun on additional buildings. When these buildings are completed the United States company will be in a position to manufacture many more of their radiators per day.

REMOVE TO NEW QUARTERS.

Frank C. McLain Co., formerly of 253 Fourth avenue, New York City, announce their removal to their new supply house at Thirty-Eighth street and Eleventh avenue, where they will carry on a general supply business in pipe and fittings, pipe to sketch and all supplies for steam, water and gas, besides their regular line of boilers, radiators and heating supplies. They have fitted up sample and sales rooms and would be pleased to have the visiting trade drop in on them in their new quarters.

WILL PROVE CLAIMS.

Great claims are made by its manufacturers for the aluminum gas tip burner made by the Gas Tip and Self Lighting Company, 298 Broadway. One claim is that 50 per cent more light is obtained by its use with the same amount of gas consumed



A. N. CHAMBERS, NEW YORK CITY
Treasurer of the Natjonal Association of Master Steam and Hot Water Fitters.

by an ordinary burner. The burner will last forever, is another claim, and it is warranted not to rust, corrode, clog or smoke. Its manufacturers acknowledge that they make big claims for their burner, but say that they stand ready to prove whatever they say in regard to it. They invite correspondence. Always mention DOMESTIC ENGINEERING when writing to advertisers.

WAS ADMIRED BY MANY.

One of the prettiest exhibits at the Pan-American Exposition was that of Colt carbide feed acetylene gas generators made by the J. B. Colt Company, 21 Barclay street, this city. The Colt generator is guaranteed to be economical, easily installed and easily operated. It occupies a very small space and, so its manufacturers claim, there is no waste of gas and no heating. A line to any one of the following addresses will bring printed matter telling all about Colt generators: 21 Barclay street, New York City; 421 Chestnut street, Philadelphia, Pa.; 146 Franklin street, Boston, Mass.; 189 La Salle street, Chicago, Ill.

AMERICAN SYSTEM MECHANICAL FILTRATION.

The New York Continental Jewell Filtration Co., 15 Broad street, is sending out an interesting book on The American System of Mechanical Filtration, which is an answer to the report made by a special committee of the County Medical Society of the District of Columbia upon the relative merit of the English and American systems. It is by Professor William Main, consulting chemist, Brooklyn, and contains much important information in regard to filtration. There is also an article in the book on the reduction of typhoid fever by mechanical filtration, made up from the statements of health officers and others equally well informed on such matters from nine cities using the American system of mechanical filtration. Mention DOMESTIC ENGINEERING.

BETTER'N PIGS IN CLOVER.

It is said that Sam Lloyd's Pigs in the Clover puzzle was the means of filling one entire hospital for the insane with good lively patients. If this statement is really true the Figure it Out Puzzle just sent out by the Joseph Dixon Crucible Company, Jersey City, N. J., will probably make it necessary for several states in the east to open new hospitals for insane. As a puzzle the Pigs in the Clover puzzle will have to play second fiddle to the Dixon company's Figure it Out.

Figure it Out is well worth writing for. All who have solved it, or think they have, will be allowed to tell how they "did it" in these columns. See what you can do with it, but before attempting it take out a liberal policy in some good insurance company so the family will be amply provided for in case anything should happen.

TIP FOR THOSE OVERLOOKED.

The Fowler Radiator & Manufacturing Company, Johnstown, Pa., have issued a new catalogue in which their well known Solus radiators for steam and hot water, their Solus semi-direct radiators and their Imperial wall and window radiators are fully described and illustrated.

The Fowler company is so situated that it can fill orders for these goods at short notice. Their catalogue should be in the hands of every member of the New York trade. It has reached a great many of the local trade, but as is generally the case, someone has probably been overlooked. If the overlooked ones will drop a postal card to the Fowler company for their new catalogue, mentioning DOMESTIC ENGINEERING, the book will be forwarded immediately.

A LITTLE INSIDE HISTORY.

Architects, builders and plumbers are much interested in trying to figure out who will be appointed superintendent of the Bureau of Buildings. It is alleged that there has been considerable rottenness in this department, as well as in several other of the city departments, and the following editorial from the Evening Sun is rather interesting reading at this time:

President-elect CANTOR of Manhattan Borough has several architects under consideration for the superintendency of the Bureau of Buildings. Two of them are strongly recommended by their brother architects and builders. "I don't know what their politics are," says Mr. CANTOR, "and I don't give a continental damn.' The administration of this bureau under Tammany provokes to strong language. Mr. CANTOR's determination to get a man of brains and honesty for the place will be regarded by the building trades as almost too good to be true, so much have they suffered from exactions and blackmail.

We are going to have a new order of things after Jan. 1, and any man who tries extortion, or violates the building laws

or uses them to annoy and embarrass honest architects and builders, will make the acquaintance of a district attorney who has no love for rogues. "Next to the Health Department," says Mr. CANTOR, "there is no subdivision of the city government which means so much to the health and welfare of all the people as that bureau which will supervise the housing of the people.

BROTHERHOOD PLUMBERS' MEETING PLACES.

The various branches of the Brotherhood of Plumbers and Gas Fitters have settled upon their winter quarters. One or two of the branches have had a little trouble to get suitable quarters in which to hold their regular meetings. But it is thought now that the halls that have been leased for the coming winter are conveniently situated.

The Phoenix Council of the brotherhood will meet on Friday nights hereafter. Its meeting place will be the Tecumseh Hall, which is at 315 West 42nd street. The members of Standard Council have decided upon every Tuesday night for their meeting night during the winter. Their headquarters are at Peper's Hall, northeast corner of 3rd avenue and 67th street. The Bronx Council has leased Muller's Casino, 3rd avenue and 154th street, in which to meet, and the Executive Board will meet at Olympia Hall, 2nd avenue and 81st street on Tuesday evenings.

"PLUMBER NOT BROUGHT UP RIGHT."

In the New Jersey National Guard there is a controversy going on that is a good counterpart of the Sampson-Schley, Sampson-Morgan troubles.

Captain Hamilton Ross, of Passaic, has been unanimously chosen by his mates in the National Guard to be major of his company, but Colonel and Brevet Brigadier-General Campbell says that Ross is a plumber and has not been "brought up" to hold such a responsible position.

The guardsmen of Paterson and Passaic have selected Captain Ross for major, and declare that they will never serve another day in the service of the state if he is turned down. Colonel Campbell has ordered Captain Ross to withdraw as a candidate for major, but the supporters of Ross refuse to allow him to do so, and insist that their major wil be Ross or no one..

In refusing to consider his candidacy for the position, Colonel Campbell was reported to have said: "As a man and an officer there is no one in the regiment with whom it gives me more pleasure to associate than you. So far as your ability as a tactician and drillmaster is concerned you have no superior in the regiment, and probably but one equal. But you are not qualified to command the Third Battalion because you have not been brought up right." There is considerable indignation among the townspeople over the affair. Ross is recognized as a good fellow and a man clear through. So they cannot see any reason for Colonel Campbell's stand.

There is no reason why, if Captain Ross is the man report says he is and that Colonel Campbell admits he is, he should not receive the additional honor his fellow guardsmen want to give him. Certainly the fact that he is a plumber and not afraid to follow an honest and honorable calling should not keep him from accepting the office of major if his company wants to vote him that office. Colonel Campbell ought to go 'way back and sit down.

MR. MCADAM, PLUMBER, GIVES PARSONAGE.

John McAdam, one of the best known plumbers in Greater New York, and the state for that matter, whose place of business is at 1353 Broadway, has set an example for rich plumbers to follow. He has bought and given to the Lexington avenue Baptist Church, at 111 street, a parsonage. The building is a handsome three-story brownstone house, convenient to the church, and is just what the Lexington Avenue Baptist Church has needed for a long time. This church has had no parsonage of its own and has always leased a home for its pastor.

The members of the church are so delighted at the generosity of Mr. McAdam that they have decided to hold a housewarming at which he is to be the guest of honor.

The Rev. Mr. Campbell is pastor of the church. He is a great friend of Mr. McAdam, as it was one of the former's eloquent sermons that converted the plumber. Mr. McAdam formerly lived near the church and just dropped in one Sunday, which happened to be a Sunday that the pastor was in one of his best eloquent moods. Mr. Adams later was baptized by Rev. Campbell and joined the Lexington Avenue Baptist Church. Since that time he has taken an active interest in the affairs of the church, especially in the financial end of its affairs.

At that time Rev. Campbell was living in rented apartments. And they were none, if any, better than the ordinary apartments in an ordinary apartment house. Mr. McAdam noticed this fact. And it didn't take much thought to satisfy him that the present of a nice parsonage to the church would be about as a nice a gift as he could make. It took sometime to work the matter up, but finally, with the aid of fellow members, Mr. McAdam, found the brownstone dwelling at 129 East 111 street. It was just the house, said the others. Mr. McAdam thought so too. So Mr. McAdam bought the place and has since transferred the title to it to the Lexington Avenue Baptist Church.

The Ladies' Aid Society and the King's Daughters are now raising funds to furnish the place, and as soon as this is done the house-warming will take place. This will probably occur within the next ten days. Mr. McAdam has recently moved his residence to 409 Amsterdam avenue.

Watertown.

HOTEL HEATING EQUIPMENT.

Young & Cook recently installed a hot water system in F. F. Bourgeoi's new hotel at Croghan. The Penn Radiator Co.'s "Classic" radiators which The Hunting-Weekes Co. have the sale of for this section, were used, in connection with a Fuller & Warren hot water heater.

DOING SOME GOOD WORK.

William Arnot, Carthage, will heat and plumb the new three-story brick block which L. H. Dunlap is building on State street, in that thriving village. The building is to contain five stores, while the upper stories are to be used for office purposes. Ten closets of the low-down style and as many enameled and Italian lavatories will be used in the outfitting of the toilet rooms. The steam heat will be generated in a Carton "C," furnished through the Internatinonal Heater Co., of Utica. "Billy's" other jobs of minor importance are a Herman furnace in the home of Mrs. N. C. Cawood and bath rooms for the residence of Fred Bachman and William Farr.

Buffalo.

MR. HUCK WON.

At the regular meeting of the Master Plumbers' Association, held Wednesday evening, November 27, a number of its members were balloted upon for the indorsement of the association for the position of member of the Board of Examiners of Plumbers and Plumbing.

A vacancy on the board occurs Dec. 31, by the expiration of the term of Charles B. Huck. The balloting was very exciting, a number of ballots being necessary to determine the successful member. Charles B. Huck won, receiving finally the unanimous indorsement of the association. Mr. Huck is also president of the New York State Association of Master Plumbers, and a former president of this association.

SUIT GOES OVER FOR THE TERM.

On the application of Attorney J. H. Metcalf, representing the Pan-American Exposition Company, the suit brought against the Exposition Company by Timothy McEvoy and George T. McEvoy for a large plumbing bill, was put over the term. On October 11 the McEvoy firm took judgment by default against the Exposition company in the sum of $7,950.99. On October 18 the default was opened on condition that the property levied by the sheriff should not be removed. Attorney August Becker will look after the plaintiffs' interests.

Albany.

GOVERNOR'S MANSION OVERHAULED.

A force of men and women under the direction of Superintendent Harry H. Bender of the state department of public buildings is putting the finishing touches to the improvements that have been made to the executive mansion since Governor Odell left it last spring.

These improvements were begun to correct sanitary defects which made the building practically untenable. Governor Odell's daughter was seriously ill last spring and her illness was attributed to the defects in the system of sewerage. An appropriation of $3,000 was made for the overhauling and improvement of the plumbing and Superintendent Bender took personal charge of the work. As a result of his work the building is in better condition than it ever was before. The work entailed a complete overhauling from cellar to roof and to-day the building is as sweet and clean as new and all of the improvements are of the most modern type.

All of the old bath rooms in the mansion have been torn inside out. All carpets have been banished and have been replaced by matched hardwood floors. The old boxed-in plumbing has given place to porcelain tubs and open plumbing of the most approved design, and in place of paper and plaster the walls are laid up with porcelain-faced brick.

Tonawanda.

UNDERTAKE BIG ENTERPRISE.

The Depew and Lake Erie Water Company has big things in prospect if their recent offer to buy the Niagara Falls municipal water plant is accepted. Besides expending $225,000 for the plant at the Falls, the company proposes building thirty-four miles of 36-inch mains. These mains will extend from Niagara Falls to Depew and water will be supplied La Salle, the Tonawandas and Grand Island.

The cost of laying the mains is estimated at $3,000,000. A small army of workmen will be employed and the line will be in operation in a few months after operations are begun.

GORTON SIDE FEED BOILERS.

Gorton side feed boilers for steam and hot water heating are on exhibition at 96 Liberty street. A line to this address will bring the latest catalogue of the Gorton & Lidgerwood Company, the manufacturers of the Gorton side feed boilers. This firm has a Boston office at 77 Oliver street, a Chicago office in the Old Colony Building, and its southern office is in the Prudential

Boston & New England

Office: 32 Oliver Street **Tel. Main 3036**

ELMER CRAWFORD, Manager **E. C. Stokes, Representative**

Bowling Popular.

Bowling parties are in vogue at The Hub among boys of the Trade.

Finds Trade Good.

Chas. Morrison, of The Richmond Stove Co., of Norwich, Conn., was in Boston last week. He reports trade good.

Use Vincent Valves.

P. & J. Tierney, of Providence, R. I., are installing Vincent valves in the water system of the new State House in that city.

Richmonds Specified.

The new city hall, at Waterville, Me., will, we understand, be heated with two 3,000 ft. Richmond boilers. The contract for the work is not yet let.

A Visitor.

E. C. Doyle, of the firm of Sweet & Doyle, Cohoes, N. Y., selling agents for the Vincent and Big 4 Valves was in Boston last week looking after the interests of their Boston branch. He reports business good.

Congratulations in Order.

Michael Roughan of the F. W. Webb Mfg. Co. The Mike who captured the 100 yds. dash Prize at the Plumbers Picnic is the happy father of a fine baby girl. The stork visited his family on Monday last. Mother and baby both doing well. Thank you.

From Maine.

The A. L. & E. F. Goos Co., of Lewistown, Me., are installing the heating apparatus in the new Knights of Pythias Hall at Lisbon Falls, The Berry House at Bath, and in Drapeau's block at Brunswick, using Wm. H. Page Co.'s boilers and radiators in each.

Heating the Medical Mission.

Mr. Albert B. Franklin, heating and ventilating engineer and contractor, has the contract for heating the new building of the Women's charitable on Hull street, Boston. Two Wm. H. Page Boiler Co.'s Volunteer boilers twinned together will be used.

A Winter's Tale.

Blake & Andros, of 26 Portland street, are sending out a very neat folder entitled "A Winter's Tale" in which the merits of their hot water heater—The Cresent— are duly extolled. A postal will bring you a sample of this neat example of the printers art.

All Vaccinated.

The employees of the F. W. Webb Mfg. Co., Elm street, Boston, were all vaccinated one day last week at the firm's expense. One of the gentlemen took matters so hard that he fainted during the operation, and this week orders for bath tubs and soil pipe are tabood because of sore arms.

A World Wide Reputation and Sale.

The Boston Brass Co., 36 Oliver street, Boston, have just completed a shipment of their famous B. B. Ball cocks to Dublin, Ireland. This adds another European country to their already long list. England, France, Germany, Holland and Spain all know the B. B. Ball cocks, which make friends wherever they go.

The Warnock Pipe Wrench.

The use of plated and polished pipe in all kinds of plumbing work is on the increase. Modern open work demands it. The marks of a wrench must not show on these polished surfaces and yet the pipes must be screwed solidly home and joints made tight. The Warnock pipe wrench will do the trick. Nothing but linen comes in contact with the pipe.

Candidate for Council.

The many friends of Jas. A. Maynard, the popular young foreign representative of the F. W. Webb Mfg. Co., will be glad to learn that he is a candidate for Common Council of Boston from Ward 8. Mr. Maynard by his bright and winning ways has made friends for himself from Halifax to New Orleans and all are expected to be present on election day.

Completes a very fine Job.

Henry Willard, of Milford, Mass., has just completed a very fine job of heating for Dr. E. A. Pratt, of Adamsdale, using a No. 5 Volunteer, W. H. Page Co.'s boiler. "The prettiest job I ever put up," says Mr. Willard. He also has on hand the heating of the residence of Frank Metcalf, using a No. 8 Volunteer.

Trade Good.

Messrs. O'Brien and Devereux of the new supply house of James Barrett Manufacturing Company, are both happy these days as trade in all of their departments has been good. The strong and well earned reputation of the old house of James Barrett & Son with their long list of specialities combined with the hustling qualities of the new members of the concern has made a combination hard to beat. A drawing card for business.

A Cabinet of Medal Winners.

The Walworth Mfg. Co. will ship their cabinet that contained brass valves and fittings direct from the Pan-American Exposition to Charleston, South Carolina, for exhibition there. It is interesting to note that this cabinet was originally designed for use at the World's Fair in Paris, and that its contents there as at Buffalo received gold medals, tokens of the highest awards. It carries medal winners and no doubt will complete its trio at Charleston.

New England Branch Opened.

The Welsbach Company, New England Department opened their new store at 68 Franklin street on the 25th inst. Their new quarters are handsomely fitted and the show room is a thing of beauty. Theo. H. Piser, the manager, states that while the retail trade cannot now be taken care of because of the immense amount of extra-work in moving he will be ready for all comers in the next 10 days.

Boston Agency Utica Heater Co.

The Rounds & Dennison Corporation, of 24 India square, Boston, who have been for the past year the agents in this market for C. S. Mersick & Co., of Hartford, Conn., jobbers of plumbers' supplies, have added the agency in this territory for the full line of Utica heaters, steam and hot water boilers, made by The Utica Heater Co. They have fitted up the second story of their ware rooms as a show room for heaters and are now ready to supply anything in the heating line. The line fits in nicely with their business, as Mersick & Co. are manufacturers of smoke and heat piping and radiators. We predict a good sale for the Uticas.

Journeymen Seek to Better Condition.

For the purpose of a more thorough organization of the trades of plumbing, steam and gas fitting and to secure the eight-hour day throughout the state, a convention of the representatives of members of the United association of journeymen plumbers, gas fitters, steam fitters and steam fitters' helpers was held in this city last week, delegates from 29 cities and towns of the state being present.

The meeting was called to order by National Pres. William A. Merrick, and was addressed by Organizer William J. Spencer.

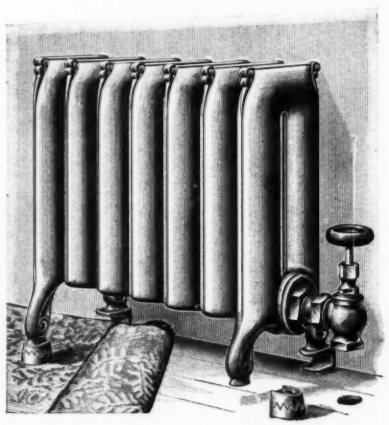
Conspicuous on the floor as debaters were delegates from Boston, Cambridge, Lynn, Waltham, Lowell, Lawrence, Fall River, Haverhill, Brockton, New Bedford, Salem and Gloucester, all of whom advocated a vigorous campaign of agitation in the unorganized districts and the establishment of eight hours as a full day's labor for journeymen and helpers.

It was further advocated that the price of labor be raised to the Boston rate and to secure a proper license law for all competent mechanics and the complete enforcement of it.

After considering these propositions it was voted to form a permanent organization to be known as a district council and the following officers were chosen: N. J. Kelley, Boston, Pres.; G. H. Coldige, Cambridge, Vice-Pres.; P. J. Curry, Lynn, Sec. Treas.; G. A. Goodwin, Salem, Sergt.

An Ideal Radiator Holder.

The Ideal Radiator holder illustrated herewith is one of the new devices to hold radiators and save cutting carpets. The holders are neat and have the advantage of



being cheap. Adams & Jones of 143 High street are the selling agents and can be addressed for full particulars.

In Favor of Canada.

Geo. P. Coppins, of The Walworth Mfg. Co., 132 Federal street, represented the Boston Chamber of Commerce at the meeting of the National Reciprocity Convention in Washington, D. C., Nov. 20. Mr. Coppins in a strong paper urged better treatment of our best customer, Canada. He said in part:

"There is no logical escape from the conclusion that Canada should be included in any scheme of trades union which is based upon Pan-American necessities. There are only a few great purchasing nations. England, Germany and France lead the list, but so far as our trade is concerned, Canada takes the third place, and, in spite of her limited population of 5,000,000, she bought of our products last year $20,000,000 worth more than France did. Canada, considering the number of its people, is our

best customer. The Canadians bought of us last year goods to the value of $20 per capita. Surely a nation that possesses such an astonishingly good customer cannot afford, on the broad principles of trade, to adopt any policy which threatens to drive him away.

"But these large Canadian purchases are not the only considerations to be taken into account. These neighbors to the north of us bought last year more of our products that are classed as manufactured goods than any other nation in the world. Nearly two-thirds of all the merchandise that we sold to them came under that classification. It hardly needs to be explained to this assembly that this is the most profitable species of trade that a nation can possess. It is well to sell wheat; it is better to sell flour. It is well to sell pig iron and steel billets to a foreign people; it is better to sell them tools, hardware, machinery and various other iron and steel commodities ready for immediate use."

Now Ready.

The Sumner & Goodwin Co., of 287-289 Congress street, have just completed the details of and are now putting on the market their "Curtis Try-metrick" valve, a flushing device for use on closets, urinals, sinks, etc., which the makers confidently assert is bound to find favor with the general public wherever such valves can be used. As its name implies this valve has a triple action. First a preliminary wash of a limited flow, an after wash of voluminous proportions, and a refill that effectively seals all traps with good, clean, fresh water. In connection with closets the depression of seat works the preliminary wash and can be so attached as to completely work the valve on raising again into position. Or valve can be arranged to work by pedal, wall or lever attachments or by high tank. The valve is small and of neat design and works under any conditions of pressure. Mr. Curtis, the inventor, is well and favorably known to the trade through his steam traps, etc. Write The Sumner & Goodwin Co., mentioning Domestic Engineering, for full particulars.

A Circular Letter.

Jno. A Fish, manager of the wholesale boiler department of Walker & Pratt Manufacturing Company, is sending out the following circular letter to the trade:

Dear Sir:

We recently had the pleasure of sending our illustrated catalogue of New Walker Steam and Hot Water Boilers, with prices and discounts.

Please notice carefully the large grate areas and heating surfaces, the size and depth of firebox, and the easily cleaned flues. Our boilers work to their full rated capacities, with a margin to spare. You need not purchase our 650 foot boiler for a 400 foot contract.

We lead the trade in selling boilers by "honest measure" and rate our boilers at their actual working capacities, with economical coal consumption. We assure you that you may rely upon our printed ratings, and reductions from them are unnecesary.

If you will favor us with a trial order, and test the merits of this boiler, you will be convinced of its superiority in design, construction and finish of castings.

We desire a good agent in every town and should be pleased to correspond with you. If possible, please call and personally examine our boiler. If through any oversight our catalogue and price lists have not reached you, we should be glad to mail copies at once with discounts.

Hoping to hear from you, either personally or by letter, we are

Yours very respectfully,

Walker & Pratt Mfg. Co.
Per John A. Fish,
Manager Wholesale Boiler Dept.

Handsome Providence Building.

We give herewith a photo engraving of the new building of The Union Trust Company, at the corner of Westminster and Dorance streets, Providence, R. I., of which Stone, Carpenter & Wilson are the architects. P. & J. Tierney did the plumbing, which is of the highest order. Among other modern fixtures Flushometers were used on all the closets. They were supplied by R. C. Inslee Co., Weld Building, Boston.

Electrolysis Causes Damage.

Although the decomposition of the water pipes of Cambridge because of the action of electrcity upon them has been going on for some time, especially heavy damage is being caused in that city at this time. The water department learned recently of a break in a pipe on Boylston street, and on investigation it was found that a part of the pipe was eaten away at the place where the electricity had left it to pass to some other good conductor. The pipe at this place was renewed only two months ago.

Still another district where damage is being caused is in Putnam square The department was called there yesterday to a leak A piece of pipe about ten feet long was entirely decomposed Electrolysis is particularly potent at this point because of the close proximity to feed wires and tracks. From these the current escapes to the pipes, which it leaves at a convenient moment. That is when the trouble is caused.

As unwished for as are these conditons, a graver danger confronts the city on Boylston street, because of the action of electricity on the forty-eight inch main of the Metropolitan Water Works. If a break happened to occur in this giant pipe Old Cambridge would be treated to a disastrous flood unless the gates controlling the movement of the water were shut down very quickly after the moment of the break. Employees of the metropolitan department were called to Cambridge recently to attend to this main. It was found that the pipe, which has a thickness of one inch, was decomposed from three-eighths to one-half inch. The perforation of the iron is apt to come at any time without the knowledge of the authorities. This main runs from Chestnut Hill Reservoir to Spot Pond, Melrose, and water passes through it at a pressure of eighty pounds.

A 20th Century Foundry.

The Walker & Pratt Mfg. Co.'s Foundry where the famous Crawford Ranges and New Walker Boilers are made, at Watertown, a suburb of Boston, seven miles out, almost adjoining the famous Watertown Arsenal, is in every way a twentieth century plant. The buildings cover about three acres of ground and are replete with conveniences and the latest appliances for turning out superior work, for economy in handling and delivering materials and finished product and for reducing insurance charges. The health and comfort of the workmen are also considered. The work rooms are as pleasant as possible; while bath rooms and sanitary appliances are installled which exceed in completeness and elegance anything previously attempted in foundries. Each workman has his own individual closet and locker, liberally supplied with hot and cold water so that he can leave the factory in as cleanly a state as the most fastidious merchant. Coffee is sold to employes at noon time at he low rate of two cents per pint and served in good style by capped and aproned waiter boys. The grounds about the buildings are tastefully planned, with curving streets, well kept lawns and ornamental shrubs and trees. In a nearby grove seats surround the trees, and garbage cans are provided, so that in seasonable weather men can eat their luncheon and drink their coffee out of doors.

In the foundry proper molten metal is brought in 800-pound ladles direct to the moulds by a system of overhead trolleys. The carriages of these ladles run on an I beam suspended from the ceiling, and a system of interlocking switches makes it impossible for the carriage to run off the track. From the "bull" ladle small 50-pound ladles are filled by the workmen and used in pouring all except very large work. In the storehouse, pig iron, coke and sand are kept under cover and protected from the weather. The entire plant is in keeping and no detail brains can suggest is neglected. The men are contented and healthy and the product turned out is in finish and detail unsurpassed.

Steam Heater Men Busy.

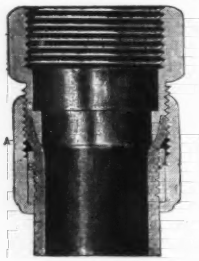
The year 1901 seems likely to go down in trade history as a record breaking year in New England in the steam and hot water lines. The manufacturers report a very heavy increase over last year's sales and fitters are working overtime. Adams & Jones, 121 High street say: "We are satisfied with our year. Ideal boilers are having a great sale. F. W. Herendeen, of the Herendeen Mfg., Co., 556 Atlantic avenue says of the Furman boilers, "Our only trouble is to get enough of them. We have had an elegant year." Mr. Thayer, of Smith & Thayer Co., says of the Winchester. "We are too busy to talk much. Have certainly had a good trade this year." Mr. Isaac of the Gurney Heater Mfg. Co., 74 Franklin street says: "Gurney way and Gurney heaters have found additional favor this year. We are very busy." Mr. Blake of Blake & Andros, 28 Portland street says: "We have sold more Crescents and of larger sizes than last year. Are well satified with our business." Mr. McDonald of Magee Furnace Company says: "We have had an extraordinary trade on Magee heaters." Mr. Davenport of The Wm. H. Page Boiler Company, 32 Oliver street volunteered at the beginning of the season to keep the trade supplied with Volunteer Boilers but has had trouble of his own. He has taken all samples off the salesroom floor.

Jno. A. Fish, manager of the wholesale boiler department of the Walker & Pratt Mfg. Co., at 31 to 35 Union street says: from information received he believes the sale of boilers has been very large this year. The conditions and general prosperity of the country have without doubt added to the demand. In his judgment there is no reason why the season of 1902 should not be as bright. He predicts a large demand for the new Walker sectional boilers.

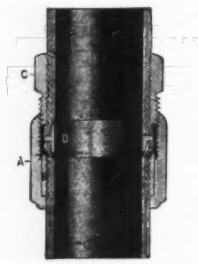
Jno. Sabin, of A. A. Griffing Iron Co., Fort Hill Sqr., says of the Bundy boilers. "Can only speak for New England, but even with a month of harvest time in the hospital my sales are ahead of last year."

A New Union.

The J. & E. Stevens Co., of Cromwell, Conn., are putting on the market Bailey's patent lead pipe coupling and connections for joining lead to lead or lead to iron pipes. In the use of the union for joining



lead pipes the pipe may butt solidly together or a rubber washer be used as desired. In applying only an ordinary wrench and a tapering plug are necessary, the plug to slightly expand the pipe into the tapering ring and nut. A left-hand thread is made by reversing the tapering nut far enough to allow pipe to stick through about one quarter inch. Use both ends to be joined in



same way. Then bring shell and nut together and set solidly. The device is simple and easily applied and by the tests from Pope's laboratory of tests the union shows that the pipe will burst or break before the union gives way. The company claim that these unions are particularly desirable in sink work, where stoppage is liable to occur, as they are easy to uncouple, clean and couple again.

Metropolitan Water System of Boston.

A reservoir is about to be constructed at Weston by the Metropolitan water commission, which will bring the great metropolitan water system one step nearer completion.

It will receive the water from the big Weston aqueduct now being built from the Sudbury reservoir at Southboro to the site of the Weston reservoir.

The two great water depots of the metropolitan system, which supplies water to ten towns and eight cities within ten miles of the state house, are Spot pond and Chestnut Hill reservoir.

These are connected, and the supply can be varied from one to the other at will.

These are supplied from a number of subsidiary reservoirs, one of which is the Sudbury reservoir No. 5, which was begun by the city of Boston and completed by the metropolitan water commission.

Besides the natural accumulation of water from springs, the Sudbury reservoir is supplied from the great reservoir at Clinton by an aqueduct of a capacity of 300,000,000 gallons in twenty-four hours.

From here by way of Framingham reservoir No. 3 it is delivered to Chestnut hill through the Sudbury aqueduct, which has a capacity of but 105,000,000 gallons in twenty-four hours. So the water of the Sudbury system, as this is called can only be delivered and used at one-third the speed at which it is received. Hence the new Weston aqueduct has been constructed with a capacity of 250,000,000 gallons in twenty-four hours.

This makes the supply of the Sudbury system immediately accessible.

The aqueduct passes through fourteen miles of variable country, which makes five tunnels necessary. With the exception of 1,300 feet of open channel as it enters the Weston reservoir, the invert and sides of the aqueduct are brick and the arch concrete.

It has a fall of one to two feet per mile. This fall, with the smooth finish which has been given to the inside of the aqueduct, insures a rapid flow of water.

From the Weston reservoir the aqueduct continues to the terminal chamber, where two lines connect with both Spot pond and Chestnut hill reservoir.

New England News.

Rhode Island.

Work in High School Awarded.

Charles O. Arnold, of Woonsocket, has been awarded the contract for installing new plumbing in the Woonsocket high school building. He will push the work through during the Christmas vacation.

Effects Settlement.

William A. Whipple, of Providence, has effected a compromise with his creditors, through the United States district court, for twenty-five cents on the dollar.

Mr. Whipple is a Manton avenue plumber and furniture dealer who was adjudged a bankrupt by Judge Brown last July. His liabilities were $61,096.75 and his assets $55,318.80.

Massachussets

Work on New Opera House.

H. L. Sawyer, of South Framingham, has the contract for putting in the heating and ventilating apparatus at "The Gorman," South Framingham's new playhouse and hall.

F. E. Bollig has the contract for plumbing, and is at work upon it.

Franklin Enslin & Co., of Ashland, have the contract for the gas piping.

The electrical and gas fittings will be set in place under supervision of James E. Kelley, head electrician at the Tremont theater, and especial attention will be given the electrical fittings.

Gets Four Heating Contracts.

Contracts for steam heating Home Street school, Sever Street school, Beacon Street fire engine house and Northville school house at Worcester, have been awarded by Mayor Philip J. O'Connell and Superintendent of Public Buildings Charles H. Peck. The four contracts went to the Allen Fire Department Supply Company as the lowest bidder on each contract. The bid on the Home Street school was $2,347; the bid on the Sever Street school was the same; on the Northville school house, $1,985.

At the Beacon Street engine house the boiler is to be furnished by the city. The bid of the Allen Company was $624, making the total bids $7,304.

Other bids were: Central Supply Company, M. D. Holmes & Son and Edward Hawes Company.

Several Good Contracts.

E. J. Carroll & Co., of Lowell, have been awarded the contract for heating and plumbing the Crosby block, corner of Branch and School streets, also for heating the addition to St. Patrick's boys' school. This firm is putting a system of heating by vapor in the residence of J. B. Cover in Lombard street.

Welch Bros., of Lowell, are installing steam heat in the house of Chas. Stoddard. They will use a Winchester heater.

S. A. Phillips, of South Deerfield, is installing a Winchester steam heater in the house of Charles Clark.

New England Building.

The estimated cost of new building and engineering enterprises projected throughout New England during the past week, as compiled by the F. W. Dodge Company, approximates $3,381,000, as against $2,657,000 during the corresponding week last year, making a total of $181,718,000 to date this year, as against $89,587,000 for the corresponding period last year. Contracts have actually been awarded this week for $6,795,000 worth of work.

Throughout Boston and vicinity the amount of work projected during the week approximates $1,543,000, making $61,255,000 to date, and contracts have actually been awarded on $5,845,000, as against $424,000 last week.

About forty per cent of the work projected in New England for the week is for dwellings, apartments and hotels, while five per cent is for mills, factories and other manufacturing buildings.

Connecticut.

Get School Plumbing.

The Board of Education of Waterbury has awarded to the Charles Thatcher Company the contract for the installation of the plumbing and sanitary plants of the Bank Street school.

Contract Goes to National Steam Economizer Co.

The committee on heating and ventilating appointed by the New Haven School Board has accepted the bid of the National Steam Economizer Co., of Springfield, Mass., for heating the new high school building. Their bid, which was the lowest, was for $22,798.

Will Plumb Two-family House.

The contract for the plumbing and hot water heating in the two-family house to be erected on Davenport Avenue, New Haven, for Henry Schoenberger, from plans by Architect Richard Williams, has been awarded to T. W. Corbett, of New Haven.

C. U. Newmann, of New Haven, has taken the contract for the plumbing and hot air heating of the two-family house which is being erected on Maple street, New Haven, for Charles E. Larom, and which is now enclosed.

Death of Prominent Plumber.

William A. Foskett, president of the Foskett and Bishop company of New Haven, died at 3:30 a. m., November 28. Mr. Foskett had been ill for nearly twenty weeks. He had suffered from a complication of diseases, more or less common to older persons. He was eighty-four years of age.

William A. Foskett was a native of Massachusetts. He spent a large part of his life in Meriden. While there he was engaged in the plumbing and heating business and when he came to New Haven he organized an independent business in furnishing heating apparatus, plumbing, etc. From the time the above mentioned firm was organized Mr. Foskett has been at its head as president. In his business career here he made for himself the reputation of a thorough business man. In business circles he won for himself great popularity and high respect.

Mr. Foskett is survived by his wife, one son, William A., Jr., and two daughters, Mrs. E. S. Brown of Nashville, Tenn., and Mrs. F. Nettleton of this city.

Philadelphia

Office: 18-24 S. Seventh Street **Telephone 21-41**

ELMER CRAWFORD, Manager. **Frank P. Turner, Representative**

Suburban Mansion Work.

Lowener Bros., 2312 Columbia avenue are at work on a complete overhauling and remodelling of the plumbing in a fine mansion at Secane, Pa.

Fine Bath Room Plumbing..

Joseph W. Temple, 1012 Columbia avenue is putting in some handsome bath rooms at the home of Mr. Penrose on Oxford street.

More Convenient.

J. Edward Hoffer, formerly at 1308 Drury street has removed his plumbing business to cosy, well lighted quarters at 27 South 16th street.

Removal.

The plumbing firm of Drew & Co. has lately removed from 1809 Girard avenue to 1216 North 19th street.

A Good Contract.

Thos. D. Clark, of 267 South 11th street, is installing the plumbing and gas fitting equipment for the Grand Fraternity building at 1414 Arch street.

New Fixtures for Dwelling.

F. L. Borie, 1009 Spruce street, is engaged in completely remodelling the plumbing in the home of Mr. Hopple, at 1940 North Broad street, using McCambridge & Co.'s goods.

Church and Baptistry Equipment.

The contract for the gas fitting and plumbing, including baptismal font installation, for the West Girard avenue Baptist Chapel, at 60th street and Girard avenue has been taken by Wm. McCoach, 1607 Sansom street.

Conservatory Heating.

Frederic H. O'Neill, 56 North 7th street is installing one of Hitchings & Co.'s new round hot water boilers at the residence of Henry S. Jeanes, 2012 Spruce street. It will furnish heat for the conservatory and a portion of the residence.

Heat for Remodeled Buildings.

Frank P. Brown, the manufacturer of gas fixtures and contractor for plumbing, and heating at 45 North 6th street, is engaged on the steam fitting for the reconstructed building of Paxon & Comfort Co., undertakers' supplies, at 529 Arch street which was burned out some weeks ago.

Up-to-Date Heating Job.

Louis J. Sommer is preparing to install a very complete and modern heating system in the new dry goods and department store of Frank L. Morton, corner of Germantown avenue and Venango street. The Broomell vapor system, controlled by the Vapor Heating Co., of York, Pa., will be used.

Nice Bath Room Work.

M. H. Whealin & Son, of 1336 Girard avenue are installing a handsome bath room for Dr. Maher at his residence, 1533 Franklin street. The fixtures are from Haines, Jones & Cadbury Co., and include a richly decorated Liberty bath tub, Hajoca closet and Italian marble lavatory with unusually fine trimmings. Messrs. Whealin & Son are also furnishing a very pretty bath room, in style very similar to the above mentioned, for Albert La Rue, at 3232 North 17th street.

Faithful in War and Peace.

William Harkness has occupied the position of secretary of the Philadelphia Master Builders' Exchange since October 2nd, 1888, and has served in the capacity of treasurer of the Master Plumbers' Association of Philadelphia since 1883, a continuous period of nearly nineteen years.

He was born in the Moyamensing district of this city on March 4th, 1837. For several years he attended the Ringgold Grammar School, and graduated from the Central High School in July, 1855. His first business experience was in the employ of Price I. Patton, a Market street merchant. During the War for the Union young Harkness served in the 22nd Regiment of Pennsylvania Volunteers, under Col. Turner G. Morehead. After his return he was engaged for three years in the plumbing business with his brother-in-law, and at the end of that time formed a new partnership with his brother John, under the firm name of Harkness & Bro.

Mr. Harkness was an active member of the famous Committee of 100, and held the office of secretary of the Citizens' Municipal Association which succeeded it. He has always been a leading spirit in all movements to elevate the standard of local politics. In 1892 when there was an urgent need for men of thorough ability and sterling integrity to serve as Mercantile Appraisers of Philadelphia, Geo. D. McCreary, the then city treasurer appointed Mr. Harkness to fill an unexpired term, at the close of which he was re-appointed, and served another full term of three years. While he has never sought any political reward he is at present serving as member of the Common Council from the 26th ward, which district he has represented in that body for nearly four years.

WILLIAM HARKNESS
Treasurer Master Plumbers' Association, of Philadelphia, and Secretary of Master Builders' Exchange.

Mr. Harkness is prominent in Grand Army circles, being Commander of George G. Meade Post No. 1, and also holds membership in Lodge 9, A. Y. M., Masonic Veterans' Association and Mechanics Institute of Southwark

A Modern Factory.

David R. Burns, 739 North Nineteenth street, is installing the power plant in the fine new building at Broad street and Washington avenue, which will be used as a factory by A. Kirchbaum & Co., the clothiers of 726 Market street. This structure, which was planned by Architect Joseph M. Huston of the Witherspoon Building, is 373 by 80 feet, seven stories high and up-to-date in every particular. Robert Scott did the steam heating and S. Faith Co. the plumbing.

A Deserved Honor.

Plumbing Contractor William McCoach, who has long served his home ward, the 30th, in the Select Council, is receiving the congratulations of his friends, who are legion, on his appointment by City Treasurer Moore to the responsible and lucrative position of mercantile appraiser. The term of office is three years and pays $6,000 per year. Those who are intimately acquainted with Mr. McCoach know that he will bring to his new field of duty the same ability and integrity that have heretofore characterized his public service and the conduct of his private business.

Good Contracts.

D. F. Durkin, the hustling and up-to-date young plumber, gas and steam-fitter of 529 South 16th street has a number of nice contracts on hand which he is executing in the most approved style. He is doing the plumbing, gasfitting and steam heating for St. Francis R. C. Church and school at Germantown, using Mott's plumbing fixtures throughout. Other religious institution work includes Convent of St.

D. F. Durkin, Jr., of Philadelphia.

Theresa, at Broad and Christian streets and remodelling plumbing in Convent of the Sacred Heart at 1819 Arch street where he is using Cooper's fixtures. He is also installing Cooper's fixtures in plumbing contracts for residence of Dr. Perkins, 1428 Pine street, residence of Joseph Rumsey 724 South 16th street and residence of Mrs. Henry Waters at 1620 Pine street. Mr. Durkin, although quite a young man has had thirteen years practical experience in the business

A Winning Combination.

No degree of publicity will bring permanent success to an inferior article; nor, on the other hand, can any production, however worthy, attain the favor it deserves without the aid of intelligent, persistent and judiciously placed advertising. One concern to whom the sterling quality of its goods, assisted by the propelling momentum of progressive and influential trade journals, has brought prosperity of the kind that counts and the kind that clings, is the Penn Engineering Co., of 312 Cherry street, Philadelphia, whose half-page space in weekly Domestic Engineering, as well as their advertisement in our monthly edition, is familiar to the trade throughout the length and breadth of the Union.

Harry H. Hellerman, the company's genial and popular secretary-treasurer, says that never before have their sales of "Penn" and "Ball Joint" radiator valves. Hanna Ball Joint pipe hangers and other specialties for steam and water come near the figures reached this year, and that their best efforts have been called into play in order to keep up with orders. The October just passed has been the banner month of all, as the volume of business was not only greater by a considerable percentage than that of any previous October, but exceeded the record of any one month in the establishment's history. "You needn't swell up and claim all the credit," said Mr. Hellerman, laughingly. "We have not received a tremendous number of mail orders mentioning Domestic Engineering—*but* seriously," he continued, "I can't understand the shortsightedness and narrow mindedness of people who refuse to give advertising credit for business unless the written or verbal order or inquiry begins, 'I saw your advertisement in ———, etc.' It is not hard to account for the coincidence that the firms who use printers' ink are the ones that get busy and keep busy. We advertise in Domestic Engineering beause through its weekly and monthly editions we reach both the jobber and the master steamfitter. We get the business and we have no kick coming. There are no obligations that we pay more cheerfully than our advertising bills."

A Household Necessity.

Too much cannot be said of the importance of having a ready supply of hot water at any time in the day or night. In case of sickness or other emergency it is a practical necessity, and considering the perfection to which devices for heating water quickly have been brought, and their comparative cheapness, it is strange that any well regulated home should be without one.

One of the handiest and most economical things of this kind is the Victor instantaneous water heater made by W. J. Adam, Joliet, Ill. The Philadelphia agency is held by John E. Eyanson & Son, 207 South 10th street, one of the oldest and most reliable plumbing firms in the city. As may be inferred from the illustration this heater is neat in appearance and takes up very little space. It will heat water in a very few seconds. The Victor heater received the highest award at the Omaha Exposition in 1898.

Plumbing in Keith's New Theatre.

Roberts Leinau, 111 South 7th street, has well under way the contract for the plumbing, drainage and gas fitting in B. F. Keith's sumptuous new theatre building now being erected on the south side of Chestnut street between 11th and 12th by contractors Wm. Steele & Sons under the supervision of architect Albert E. Westover of 501 Watkins Building, 1031-33 Chestnut street.

The roof water, soil and waste drainage will require five separate systems, four of which will be each by a separate six inch drain, two to the Chestnut street sewer and two to the sewer in Sansom street. The waste from plumbing fixtures in the basement (which will be below the bottom of sewers will flow to an improved sewage lifting apparatus, made by the Adams Patent Sewage Lift Co., 1107 Walnut street, and be raised and driven automatically to Sansom street sewer. These systems will be constructed of heavy and extra heavy cast iron pipe, every means being used to make the ventilation scheme equal to the most modern and approved arrangements of that kind, adapted for use in large buildings.

The water supply will be delivered by two systems from the city mains, one three inch main from Sansom street to supply the plumbing fixtures in basement, first and second floors, and a four inch main from Chestnut street to a large suction tank in the basement. From this tank the water will be driven by powerful pumps to a large tank located on the roof, and from thence, by liberal sized mains and branches, will supply all fixtures on and above the third floor, in the auditorium building and in the eight story north wing as well.

The portection of the building from fire will be complete in every detail four stand pipes, each four inches in diameter, being provided, two in the audience hall and two on the stage, together with an improved fire house outfit, including valve and one hundred feet of best fire hose, located in an accessable place on each floor and landing. The arrangement is such that the hose can be promptly supplied with water from either the great tank on the roof or by a ponderous fire pump to be located in the basement.

The hose will be equipped with Philadelphia Fire Department regulation couplings and the house pump, to tank will be cross-connected to the discharge pipe from fire pump, which will guarantee a water supply to fire lines in case of repairs or accident to either pump.

All plumbing fixtures requiring hot water will be supplied by a 250 gallon heavy galvanized iron hot water generator, which will have a copper coil so arranged as to be heated by steam, and be equipped with safety valve, thermometer, etc. This hot water generator, made by the Thompson Iron Works, 1825 Callowhill street, will be located in the basement and supplied by a three inch pipe from the tank on the roof. Each hot water vertical riser will have a return hot water circulating pipe connected with main return to generator.

The hot and cold water supply systems will be constructed of heavy galvanized wrought iron pipe, except those exposed in toilet rooms, which will be nickel plated brass, all properly valved etc., complete.

The gas pipes of standard sizes to be laid throughout the building, will amply supply all burners simultaneously with a full head of gas.

Gas outlets will be located in basement, boiler room, fire escape doorways, stair landings, dressing rooms, and on side walls of audience halls, etc.

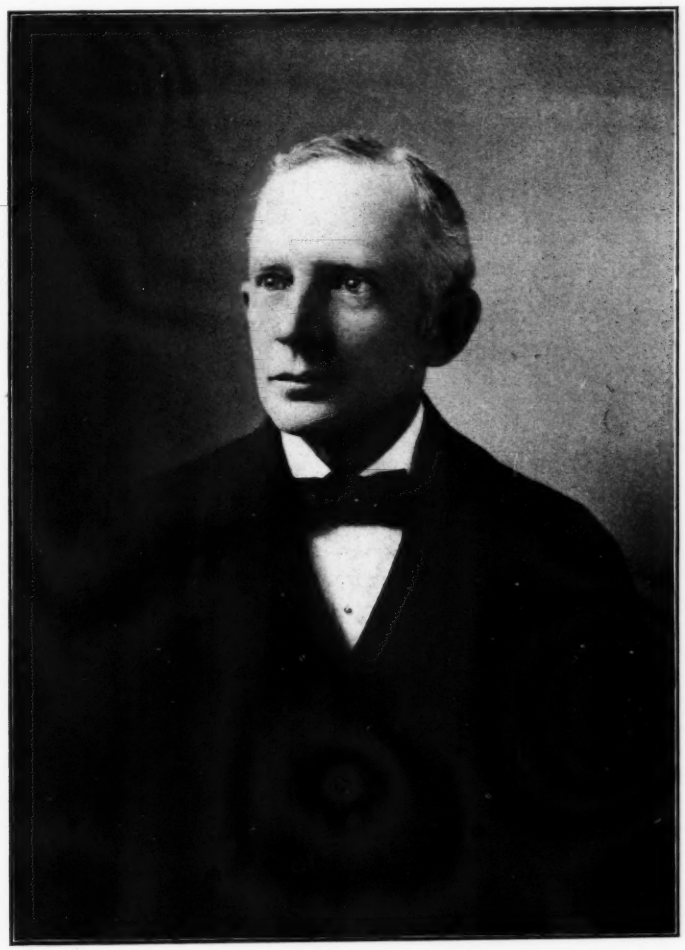
The toilet rooms for ladies and gentlemen on each floor of auditorium building, and on the upper floors of the north wing will be large, well lighted and adequately ventilated, as will also those for actors and employes. The principal toilet rooms will have interior finish of white marble with nickel plate brass fittings. The water closets will have local vent attachment, reaching by a series of pipes to the loft and operated by a large air suction propeller run by electric power.

The closets, twenty five in number, will be Irwin & Mitchell's "Perfecto," made in the latest form of the porcelain, syphon jet type, with copper lined, hard-wood finished flush tanks. There will be fourteen of the same firm's. "Perfecto" syphon jet unrinals set in marble stalls.

The total number of wash basins will be fifty-nine. Those in the toilet rooms will be white porcelain set up in white marble, supported on nickel plated offset legs, and fitted with nickel plate faucets, supply pipes, and improved nicel plate brass traps.

All the lavatories will be supplied with hot and cold water, as will also the five enameled iron roll rim sinks. Each dressing room will have an enameled iron wash basin or sink furnished with hot and cold water.

Especial care has been taken to provide that all the toilet rooms, dressing rooms, etc., shall be of a sanity and hygienic design, well lighted, well ventilated and comfortable.



WILLIAM CONWAY
President of the Master Builders' Exchange, of Philadelphia.

A Thorough Business Man.

William Conway, of whom we present an excellent likeness in this issue, was born in Philadelphia, July 17, 1855. After receiving a good common school education he entered his father's soap manufactory, learning the business in all its details, and afterward became a partner in the firm, he and his brother succeeding their father in the business.

In 1887, having purchased a valuable tract of clay land in West Philadelphia, Mr. Conway became engaged in the manufacture of bricks, soon becoming one of the largest producers in the city. He became a member of the Master Builders Exchange of Philadelphia in 1887, the year of its organization, and in 1896 was elected to the Board of Directors, of which he is still a member. After serving as vice president, he was elected to his present position of president of the Exchange in February, 1900.

Growing Supply Business.

The Shuster Foundry Co., Franklin and Willow streets, are now carrying a full and complete line of plumbing supplies and are prepared to furnish anything from a rubber stopper to an entire bathroom outfit. By energy, promptness, courtesy and fair dealing they have built up a nice business in Philadelphia and surrounding territory. They are just filling one good order in which eleven of their "Franklin" combination closets and other fixtures to match are used. The stylish little leather-bound gilt edged plumbers' plan register, which the Shuster Foundry Co. is presenting to members of the trade who will call at their office for it, is meeting with much favor and appreciation.

President Uber's Big Contracts.

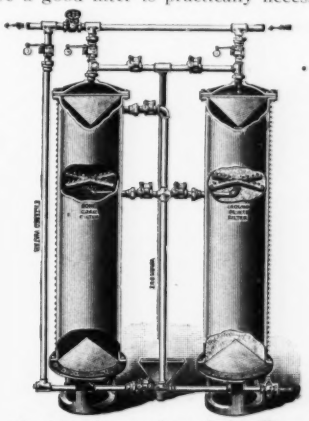
One of the busiest people in Philadelphia is energetic and popular George F. Uber, who is a man of large affairs these days sure enough. A couple of weeks ago he was awarded the plumbing contract for Gimbel Bro.'s mammoth new department store at 8th and Market streets, and now he has captured both the plumbing and heating contracts for the half million dollar fifteen story Commonwealth Title, Insurance and Trust Co. building which Doyle & Doak have begun at 12th and Chestnut. The Durham system of drainage will be used in both of these operations. The contracts on these two structures, together with the Masonic Temple at Reading and two large government buildings at the Philadelphia Navy Yard at League Island, which Geo. F. Uber & Co., also have in hand, represent a sum in excess of $100,000. Among other work they are also finishing up contracts on the Levy office building, 1416 South Penn Square, apartment house at southwest corner of 12th and Spruce and large residence at the corner of Broad and Reed streets.

Filters Give Satisfaction.

It takes something pretty good to satisfy Uncle Sam, and the fact that the seven Field Duplex One-Valve filters, installed at the U. S. Naval Home, Gray's Ferry Road and 24th street, have done more than was promised and fulfilled every requirement, is a high tribute to the merit of this machine, which is manufactured by D. W. Field, Builders' Exchange, 18-24 South 7th street.

A Strongly Endorsed Filter.

The subject of water filters is one of vital interest and importance in Philadelphia, where a good filter is practically necessary



to the health of every household. There are a number of makes of greater or less excellence, but one of the most highly recommended is the McNally Duplex filter, manufacture by Robert J. McNally, 5618 Germantown avenue. This apparatus was given first place in the tests made by the Bacteriological Department of the Board of Health a year ago last summer and was adopted for use in the public schools of Philadelphia. In the McNally filter, which is strongly made of heavy galvanized iron, there is no alum, or any coagulant whatever used for clarifying. Ground flint only is used in the first filter, because of its superiority for removing suspended matter, being non-absorbent and easily cleaned. Pure bone black (animal charcoal) is the only filtering material used in the second cylinder, that being considered the very best substance for clarifying purposes. The peculiar construction of the cones at the top and bottom of flint and charcoal beds prevents them from packing and checking the flow and pressure of water. The mechanical construction and method of cleaning have especial points of superiority. Both sections are cleaned with filtered water.

Handle Standard Specialties.

Brogan & Co., 810 Race street, who were formerly engaged in the steam heat contracting business, dropped that line entirely some time ago and are now engaged exclusively as dealers in pipe, valves, fittings, tools, and steam specialties.

One of their leaders is the Atlas pipe wrench, made by the Atlas Pipe Wrench Co., of New York and San Francisco, which lately received the highest award at the Pan American Exposition. It is made

in four sizes, 10, 18, 24 and 36 inch, to handle everything from ⅛ inch wire to 4½ inch pipe. A distinctive feature is the three slot, movable jaw arrangement by which an 18-inch wrench, for instance, can be adjusted to fit any size of pipe from ¼ inch to 2 inch.

The illustration shows that the teeth grip the pipe at an angle, and that the gripping point is in advance of the handle, demonstrating that the pipe, in being turned, is pushed ahead, and that he tool does not

dig into the pipe and drag it, as many wrenches do, and consequently does not crush it. This form of construction also guarantees the wrench against locking on the pipe. Another good point in the Atlas is that there are no nuts to jam and no delicate parts to get out of order or break.

Brogan & Co. also carry a full line of Kieley & Mueller's steam specialties and Lawler's return circuit check valves and hot blast gas burners.

SUCCESSFUL FRANKFORD PLUMBER.

John A. Quinn, 1613 Unity street near Frankford avenue commands a most desirable class of custom in that section of the city. He has found the present season quite a busy one, one of his neatest pieces of work being the plumbing for the new Frankford post office building on the suburb's main thoroughfare. Among the contracts which Mr. Quinn has recently engaged on are, residence of F. W. Kennedy,

JOHN A. QUINN, of Frankford, Philadelphia.

Adams Road above Orthodox street; store of John Cocker's Sons, 4425 Frankford avenue; residence of Wm. B. Horrocks, 1142 Arrott street; 1310 Arrott street; Joseph Bromiley's large upholstery factory, Adams and Leeper streets; two cottages for Mrs. Hannah Buckius 1526-28 Overington street; large and handsome residence of Walter Smidley at Wynnefield.

GROWING IN FAVOR.

Although the building season may be said to be waning there is no diminution to the popularity of the Walls & Pearsall Anti-Freezing closet. It is especially in demand for outside locations where other closets would freeze, being perfectly frost proof even in zero weather. One of its chief recommendation is its simplicity in construction and action, the tank containing no ball cock or washers and no chain pull being required. While no water is held above the frost line, a quick, automatic flush is given after e ach using.

It is a mistake to suppose that all these advantages necessitate a high price for the combination. On the contrary, considering their quality and durability, the cost of these closets is surprisingly low. A line to Walls & Pearsall, 305-307 North 12th street, not forgetting to mention DOMESTIC ENGINEERING, will bring prices and discounts.

News from Pennsylvania.

SAMUEL GIBSON DEAD.

Samuel Gibson, aged 54, died Nov. 27th at his home, 2304 Wylie avenue, Pittsburg. He had been ill for several months. Mr. Gibson was a veteran of the Civil war. He was a plumber, and for many years conducted an establishment on Center avenue. Mr. Gibson was a member of the Wylie Avenue Presbyterian church and Colonel Rippey Post 41, G. A. R. He is survived by his wife, a son, Robert, and one daughter, Miss Jennie Gibson.

A BUSY PLUMBER.

Reading, Pa., Nov. 19.—A busy plumber is George H. Stichter, 139 South 6th. He is at present equipping the Liberty Dye Works, at Mifflin and Chestnut, with five closets, a bath room, complete, all the sanitary plumbing, etc. He is about completing the nickel plumbing in six houses built by Hoff Bros., on the west side of Pear near Oley, and is putting in new bar fixtures, draining pipes, etc., for Henry Wise, proprietor of the Jefferson House, on South 7th. Besides this he has a number of smaller jobs on hand. Six men are employed.

WORK PROGRESSING RAPIDLY.

Williamsport, Pa., Dec. 3.—A. M. Thomas, who was awarded the contract for putting water and sewer systems into the big shops at Oak Grove, has about thirty men at work under the supervision of James Laughlin. About 5,000 feet each of water and sewer pipes will be put in, besides the man holes, catch basins, etc. Mr. Thomas obtained his contract from McArthur Brothers, and it is for all the water and sewer systems of the main shops. The work has been in progress for several days. It is not known yet positively where the water supply will be obtained for the shops.

WHILE TEMPORARILY INSANE.

Shamokin, Pa., Nov. 19.—This morning at 6:50 o'clock C. D. Felix the well known plumber committed suicide by placing a double barrel shot gun in his mouth and shooting the top of his head off in a fit of temporary insanity, dying instantly.

The deed is one of the saddest happenings of our town for a great while as Mr. Felix was one of our best known and most highly respected citizens, having been engaged in the plumbing and tinning business for many years. For the past several months the unfortunate man has been suffering from nervous prostration and fits of temporary insanity due to worriment caused by his business.

Mr. Felix has been a life long resident of this town having been born and raised here. He was forty-six yars of age and has always been of a jovial cheerful nature and generally liked by all, who came in contact with him. His many years of business in this community has brought him the reputation of being a business man of much sound judgement.

Several months ago Mr. Felix was stricken with nervous prostration and for several weeks was away for his health returning much benefited.

He leaves a wife and three daughters, Misses Eva, Lou, annd Clementine, who have the sympathy of the entire community in the sad hours of their bereavement.

News from Pittsburg.

ADDITION TO SCAIFE MILL AT OAKMONT.

A small addition to the William B. Scaife and Sons mill, at Oakmont, is being completed. On account of increased business, large additions have been made during the past year to all departments. The company recently acquired 28 acres of desirable manufacturing property in the valley. It is understood that the works will be more than doubled in size in the near future. Almost 400 men are now employed. The company is engaged in the manufacture of galvanized range boilers and structural iron.

ESTABLISH SICK BENEFIT.

Local No. 27, Journeymen Plumbers, has taken the initiative toward the establishment of a national sick and death benefit. At the last national convention of the plumbers this union secured the appointment of a committee of six, the duties of which would be to draft articles for the establishment and operation of such a benefit. At a special meeting of Local No. 27, held Monday night, action was taken in this direction, and a subscription raised to assist in creating a general fund. J. J. McKee, who is a member of the general committee and business agent of Local No. 27, was chiefly instrumental in bringing about this result. The general committee, now that subscriptions to the fund have started, will meet some time next year previous to the annual convention and complete the work assigned. Local No. 27 is one of the largest labor organizations in the city, and up to the present time has been maintaining the sick and death benefit of its own.

CLOGGED WITH ROOTS.

Plumbing Ispector Albert S. Whitehead, of Allegheny, had his attention called the other day to one of the most unique phenomena in his experience. Workmen while taking up a line of terra-cotta sewer pipe on Perrysville avenue, found the six-inch pipe clogged for a distance of 40 feet with fine roots and fibres of Carolina poplar, the mass being compact. Inspector Whitehead says: "The sewer pipes made of terra cotta which are laid all over the city, are, I am afraid, clogged more or less in the same way. Complaints have been made to me that terra cotta pipes dug up on Lithgow and Wheeler avenues have been found clogged in a similar manner. The reason is obvious. All terra cotta pipes are defective at their joints, and the roots from the trees and grasses can easily penetrate them. There being nearly always some dirt and moisture in the sewers the roots are thus nourished and grow rapidly. I believe it was for this reason the State law was passed which compels cities and boroughs to restrict property holders to the laying of only iron or steel sewer pipes to within five feet of the building. I think the law should include up to and into buildings also, for within a few days terra cotta sewer pipes have been found in cellars of houses on Wheeler avenue with this same rope-like substance clogging them."

Dominion of Canada

Toronto Office: Globe Building. Montreal Office: 301 St. James St.
Quebec Office: 96 St. Peter St.
ELMER CRAWFORD, Manager Victor H. Ross, Representative

Toronto

Into Electricity.

The electrical business of the Parkdale Furnace Co. is now in charge of Mr. Geo. E. Davenport, who is handling that branch of the business which affects electric bells, annunciators, etc.

Sold at Auction.

The plumbing stock of Bates, Robinson & Co., 128 Bay street, Toronto, Ont., was sold at auction by the assignee en bloc, December 3. It consisted of about $1,000 worth of merchandise.

Big Demand Still.

All of the furnace and stove manufacturers are still oversold, and there is as yet little sign of a diminution in orders. The business will, it is expected, be maintained for at least a fortnight longer.

To Begin Again.

The firm of Bates & Robinson are to reenter business under the old name although they will probably change their location. Others than the original members of the firm will be interested in the new venture.

Increasing Facilities.

Rice, Lewis & Son, 32 King street, E., Toronto, are building an addition to their already large establishment in which they propose to manufacture on a large scale all electrical devices used in house construction.

Exporting Furnaces.

The Parkdale Furnace Company have placed one of their No. 3 Double Radiator Diamond Furnaces in one of the largest restaurants in Detroit, the purchaser paying the customs and freight charges in order to secure the article.

Fire at Bradford.

Bradford, Nov. 28.—Burgess Acetylene Gas Works here were partly destroyed by fire this afternoon. Some of the mains on the road were opened to let the gas escape and an explosion was thus avoided. Loss heavy; no insurance.

Iron Pipe Advances.

Jobbers in wrought iron pipes have already advanced their prices in response to the advance of 7½ per cent made by the manufacturers late last week. Jobbers have for some time been selling pipe at little or no profit, and the advance is regarded as being justified.

A New Catalogue.

The Ontario Lead & Wire Co., Limited, 54-56 Lombard street, Toronto, are preparing what they expect will be the most complete catalogue of plumbing supplies ever issued in the Dominion. It is expected that this catalogue will be ready for distribution early in the year 1902 and applications for it now will be placed on file if you mention Domestic Engineering.

The Largest Steam Whistle.

In the show rooms of the Jas. Morrison Brass Mfg. Co., Limited, 91-97 Adelaide street, W., Toronto, there is on exhibition one of the largest steam whistles ever constructed in the Dominion of Canada. It is fourteen inches in diameter. Two of these whistles are already in use in very large manufacturing institutions.

Smead-Dowd System Abolished at Junction School.

At the last meeting of the Junction Public School Board a resolution was adopted in which it was decided to abolish the Smead-Dowd system, and install flush closets. Owing to the fact of there not being sewers near Annette street school, the board will have to further consider the disposal of the sewage.

Improvements in Hotels.

Heating plants of the most modern character have been installed in the Benson House at Lindsay, Ont., and the Russell House, St. Catharines, and several other leading hotels in the smaller towns of the Province will shortly make similar improvements. The work in the two hotels mentioned was carried out by the John Ritchie Plumbing & Heating Co.

Doing a Fine Business.

Mr. A. Byrne, proprietor of the Garlock Packing Co., 22 John street, North, Hamilton, reports that he is doing a fine business in pipe and boiler coverings, of which he makes a very large line. He also manufactures the Garlock packing for steam, water and amonia, and is wholesale dealer in engineer, mill and steamboat supplies. He will be glad to send prices of pipe covering upon application mentioning Domestic Engineering.

Ritchie's Have It.

The John Ritchie Plumbing and Heating Company is now engaged on the contract for the plumbing and steam heating of the new building of the Toronto Lithographic Company on King street, West. The same company has the contract for extensive plumbing and heating work in a magnificent residence that Mr. C. H. Acton Bond of the firm of Bond & Smith, is erecting on Indian Road.

To Organize Brantford.

A project is on foot to form an association of the Master Plumbers of Brantford, and indeed several prominent members of the Dominion Association intended visiting that city for the purpose of initiating the work quite recently. These officers were however, unable to go to Brantford, but it is expected that they will visit that city soon and that a strong organization will be formed. The trade in that section is said to be anxious for such action to occur.

Provincial Associations.

The effort now being made to form Provincial Associations of Master Plumbers, is likely to prove successful in Ontario, and it is hoped that if this is the case other provinces will follow suit. Strong organizations in the provinces having capable heads would do a great deal towards assisting the work of the National Association, and it is to be hoped that every opportunity and assistance will be given those who are endeavoring to consolidate the local organizations.

Association's Officers.

At the next meeting of the Toronto Plumbers' Association, it is expected that the present president, Mr. J. H. Wilson, will ask the permission of the Association to relinquish the office which he has held with so much honor for the past three years. Mr. Wilson has given a great deal of time to the service of the association, and feels that another member should be elected to the office. In view of certain occurrences in the trade within the past month, it is probable that if Mr. Wilson is permitted to retire, the election of the next president will not be made by right of succession.

Business Brisk.

There is scarcely a plumbing business in this territory that is not filled with orders, and the present condition of the trade is perhaps better now than it has been in the last ten years. Members of the trade however, complain that prices for contract work have not increased, and that while there is a great deal of business offering, competition even in the face of the splendid stimulus that has been given to trade, has greatly decreased profits. The quotations on supplies are slightly higher than at the same time last year, but in the general improvement in business this is scarcely noticed.

Lighting and Heating Plants.

An attempt is being made to form a block plant whereby the lighting and heating of each business block in this city shall be supplied from a central plant, within that block. The idea has not as yet had a practical test although several business men have already signified their intention of engaging in the experiment. If the present venture proves successful it will mean that a great deal of work will be necessary in connecting the various business houses with the different plants.

Obstructed the Sidewalk.

John Parker, an employe of Bennett & Wright, the plumbing firm, was fined $1 and costs for carrying long gas pipes and lumber in the crowd on the sidewalk in front of the new Davies' building on Queen street, near the City Hall. His loads were too big, and some of the stuff dropped on the sidewalk. When spoken to by Constable Archibald McDonald, he was inclined to be obstinate and stand on what he fancied were his rights.

Iron and Steel Market Report.

No sign of the usual seasonable quieting down in the demand for iron and steel is apparent. The big steel interests are reported as having plenty of cars but not enough motive power is offered. Bradstreet's Halifax correspondent reports large sales of Cape Breton steel in the United States. Light and heavy hardware is active, and the supply of tin has been practically cornered with the result that prices are 5c per pound higher on the week.

Busy New Firm.

Mr. Herbert Johnston has now become a member of the firm known now as Maxwell, Doughty & Johnston. The firm is new but is now known as one of the most enterprising in this city. All of its members are old employees of the Bennet & Wright Co. It was formed first by Messrs. Frank Maxwell and Charles Doughty, well known plumbers, and within a few months of its inception Mr. Herbert Johnston was taken into the business to assume charge of the steamfitting. The firm has now over twenty men employed, and their office on Bay street, opposite the Temple Bld'g is a busy institution.

Sewage Disposal.

Dr. P. H. Bryce, Medical Health Officer for the Province of Ontario, will address a meeting of Architects at an early date upon the subject of "The Proper Disposal of Sewage of the Institutions and Towns where no System of Public Sewers Exist." Dr. Bryce, has already devoted a great deal of time to the subject, and his address is being awaited with much interest. Many of the summer hotels, recently erected in Muskoka, as well as many towns which have

become well known as favorite resorts for summer tourists, are lacking in sanitary conditions, and it is probable that Dr. Bryce will refer to them in his address.

A Large Heating Order.

The J. F. Pease Furnace Co., Limited, 189-193 Queen street, E., Toronto, manufacturers of the "Economy" furnaces and heaters, has just shipped a complete gravity warm air heating system for the public school building in Edmonton, Alberta, the farthest point north in the British Provinces to which a railway runs. This plant is intended to heat a school building of thirteen rooms and a large auditorium which makes the job equivalent to a fifteen-room building. The company reports having had the largest year's business since its establishment eleven years ago and that the prospects for business during the coming year are most excellent.

Great Year for Building.

It is nine years since the building permits issued in Toronto in November have approached in value those of that month this year. The total was $409,710, and, with the exception of two small factories, the permits were all for houses for the people. No less than sixty new houses were started last month, as well as two large apartment houses. In November of last year the building permits were of less than half the value of those of November this year.

So far the building operations in Toronto this year, amount to $2,373,958, and the million dollar hotel in course of construction is yet to be counted in. This time last year the permits issued represented an aggregate value of $1,834,251.

Collingwood to Have New Boiler Foundry.

John Birnie, K. C., states that the Collingwood Ship Building Company have just acquired a large block of property in that town for the purpose of establishing a large plant for the manufacture of boilers for ships. The property includes all that facing on Huron street, taking in the site of the old post office. Work on the construction of the new industry will be commenced immediately.

He says that the Cramp Steel Company are making good progress in the construction of their new establishment. When completed there will have been 400 car loads of machinery installed in this new industry.

New Medical Building.

Provisional plans have been drawn up for the new building to accommodate the third and fourth year classes in medicine at the University of Toronto. The building will be 150 feet square, with a central courtyard or well to admit light. The site has not yet been chosen, the places mentioned being the Mickle House, northeast of the present School of Practical Science, and the plot in front of the new Technical School. There is also talk of uniting under one roof the proposed medical building and the new science building. The financing is still under consideration by the trustees and government.

Bates & Robinson Fail.

Bates & Robinson, plumbers, on Bay street, Toronto, have assigned to Mr. E. R. C. Clarkson. The liabilities are $6,000 and assets $3,800. For some time past the firm have been endeavoring to make a compromise at 25 cents on the dollar, and some of the larger creditors were agreeable to this. One of the creditors, however, objected to any compromise being made, and an assignment was the necessary result. On October of last year the firm admitted a partner by the name of Heron, who put in $3,000 cash, which has, of course, been lost. While an offer of 25 cents on the dollar was made and refused, it is not expected, now that the firm is to be wound up, that the creditors will receive more than 7 or 8 cents on the dollar.

Engineers' Reunion.

The fifteenth annual dinner of the Canadian Association of Stationary Engineers took place at the Walker House on the evening of November 28. The guests numbered upwards of two hundred, the largest assemblage that has ever sat down in the dining-room of the Walker House. Mr. W. H. Webb, president of the local branch, was in the chair, and the guests included Ald. Pettigrew, Thos. Elliott, and Joseph Ironsides, of Hamilton; W. Oelschager, Berlin; A. M. Wickens, Dr. J. O. Orr, Ald. Frame, John Galt, and J. J. Main, Toronto; and Arthur Ames, Brantford.

The dinner was organized by a committee, of which Mr. H. E. Terry was chairman, and Mr. James Bannan secretary.

Plumbing in the Royal Train.

The royal train of cars constructed by the Canadian Pacific Railway for the accommodation of the Duke and Duchess of York during their visit to the Dominion has been on exhibition at the Union Station, Toronto, for some days. It consists of a baggage car and the royal coaches "Canada," "York" and "Cornwall." These coaches have been constructed with a view to giving the greatest possible comfort attainable in railroad travel. The sanitary conveniences placed in the train are elaborate and complete. There are a number of bath rooms ontaining porclain enameled tubs on which the rims are made of padded white rubber, preventing dangerous bruises if used while the train is in motion. There are also shower baths, the walls of which are similarly padded. The lavatories are from the well known establishment of Twyfords, Limited, of Hanley, Staffordshire, while the closets are known as the "Rex," manufactured under the Hart and Dayton patents. Probably no train has ever been constructed containing more complete and elaborate conveniences of this character, and the Canadian Pacific Railway have set a pace which will be hard for other railways to follow.

First Apartment House.

Keith & Fitzsimmons, of 111 King street, West, have the contract for the plumbing and wiring of the first apartment house to be constructed in Toronto. The apartment house will be situated on St. George street, and the leases of apartments have already been taken by fashionable people. The firm will provide steam heating on the low pressure, single pipe system with direct radiation for each room. There will be two large tubular steam boilers for the supply of steam heating; and also a crematory and combined hot water heating apparatus for the baths, with a 300 gallon steam tank. Every suite in the house will be provided with a sink, and gas stove attachment in the kitchen, a copper sink in the pantry, and hot and cold water attachments to all fixtures. The building will also be fitted out by Keith & Fitzsimmons with electric wiring for lighting with a separate meter to each room for both electricity and gas. The wiring for electric bells for each apartment and for the halls will also be provided. There will also be a large water main which will run from the basement to the roof with hose attachments on each floor. In all there will be thirty-six bath rooms with fifty "Majestic" low down combinations, these last being supplied to the contractors by the Ontario Lead & Wire Company, Limited.

Northern Tube Mills.

Mr. F. H. Clergue and his associates in the development enterprises in New Ontario, have not yet decided as to whether the new tube mills will be erected upon Canadian or American territory. It is stated however, by a competent authority, that the location of the mills will be at Sault Ste. Marie on the Canadian side and that the erection of works will be begun as soon as the steel rail plant now nearing completion, is finished. The blast furnaces at the Soo, are already in shape, and the vast quantity of ore at the St. Helen Mines is awaiting shipment. Transportation from the mine to the steel mill, is comparatively easy. The railway from the mine to the Michipocotan Harbor is all down grade, and there are splendid water facilities for transportation from the harbor to the mill. The tariff upon manufactured products of this kind is the only obstacle in the way of those who hope to see the mills erected upon the Canadian side, and it may be possible that at the last minute the company of which Mr. Clergue is the head, will decide to place the mill at the American Soo. A subsidary company headed by Mr. Clergue, and known as the Franco-Canadian Navigation Company has just been formed with a capital of one million dollars. The prospectus sets forth that the company will engage in a general steamship and forwarding business from Sault Ste. Marie, and this gives colour to the belief that the tube mills will find a location upon the Canadian side. The provisional directors are: Messrs. F. H. Clergue, R. Mackay, E. V. Douglas, G. E. Drummond, and L. E. Geoffrion.

Resolution of Condolence.

Mrs. Alexander Fiddes, the widow of the late valued treasurer of the Toronto Master Plumbers' Association, has received a copy of the resolution of condolence passed at the last meeting of the Association. The loss of Mr. Fiddes is being severely felt by the organization of which he was so prominent a member, and it is recognized that the appointment of a successor will be a difficult matter. Owing to the fact that the annual meeting of the Association will take place very early in the year, no successor to Mr. Fiddes will be elected at the present time and the partner of the late treasurer, Mr. Hogarth, who is one of the auditors of the association, is to be asked to take over the books until the end of the fiscal year. Mr. Fiddes was among the most popular successful men in the trade in Canada. He was born in Scotland and served his apprenticeship there, and when he came to Canada his indomitable perseverance and business ability soon brought him to the front rank, and his unfailing geniality, breadth of view, and kindness of heart made him the friend of all of those with whom he came in contact. At the last meeting of the National Plumbers Association, his services in connection with the organization, were recognized by the presentation to him of a beautiful Masonic ring. In life Mr. Fiddes was a prominent member of the Presbyterian Church in Canada, and also one of the leading members of the Caledonian Society.

The Morrison Catalogue.

The Jas. Morrison Bros. Mfg. Co., Limited, of Toronto, have issued a most beautiful catalogue of plumbing specialties. The

book is printed on the highest grade of enameled paper and is a credit to its pro-

ducers. It is fully illustrated with cuts made directly from photographs and shows the very latest designs of high grade sanitary work. The constant aim of the company is to produce only articles of the highest grade of excellence and this catalogue shows to what an extent they have been successful in this aim. Every page carries with it this trade mark and statement, and any goods bearing the well-known triangular trade mark will be found thoroughly satisfactory or will be made so if not so found. Upon application mentioning DOMESTIC ENGINEERING a copy of this catalogue may be had by those interested in the trade.

THE "SAFFORD" RADIATORS.

We are in receipt of catalogue "F" issued by the Dominion Radiator Co., Limited, of Toronto, Ont., illustrating the "Safford" radiators. The plant at which these radiators are manufactured is located at 340-376 Dufferin street, Toronto, and the selling agents and representatives are as follows:

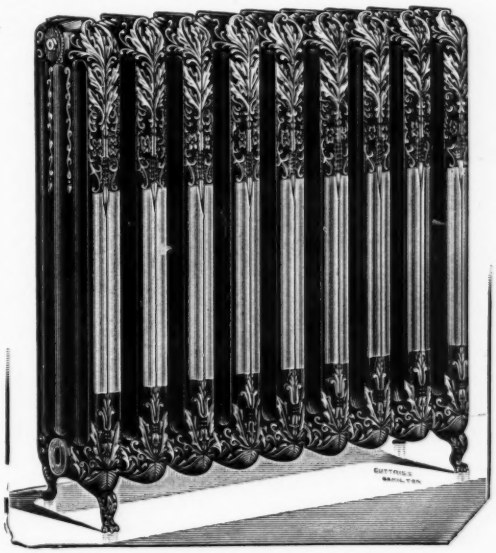
Hy. McLaren & Co.,
Agents for Montreal and Province of Quebec,
700 Craig street, Montreal, Que.
Mechanics Supply Co.,
Agents for Quebec,
96 St. Peter street, Quebec, Que.
W. A. Maclauchlan,
Agent for Maritime Provinces,
54 Dock street, St. John, N. B.
Vulcan Iron Co.,
Agents for Manitoba and N. W. T.,
Winnipeg, Man.
Boyd, Burns & Co.,
Agents for British Columbia,
Vancouver, B. C.

The "Safford" radiator is constructed with screwed nipple connection. There are no bolts, packing or gaskets of any kind used in the radiators, hence there is absolutely nothing to get out of repair. They

are made for water or steam and either pattern can be easily taken apart by any fitter if necessary without difficulty. It is a matter of considerable satisfaction to the Dominion Radiator Co., Limited, that its radiators have been specified in all high class buildings and have been shipped to every recent exhibition of importance. The company manufactures a large variety of styles and sizes and is constantly supplementing these with new designs. At any time they will be pleased to send their catalogue to any architect, steam or hot water fitter upon application mentioning DOMESTIC ENGINEERING.

THE HAMILTON RADIATORS.

The Gurney-Tilden Co., Limited, of Hamilton, send us their catalogue of Hamilton radiators made by them in their large foundry at Hamilton. We illustrate their four-loop ornamental radiator for hot water or steam, each section of which contains 9 2-3 square feet of heating surface. It is 42½ inches high and can be made from 2 to 23 loops in length. They also make this radiator in heights of 38½ inches, 32½ inches, 26½ inches and 20½ inches. The catalogue illustrating this and other styles of radiation made by this company is admirably constructed, there being a tele-



graphic code word for each size of each style manufactured. The book also contains a large number of buildings in which these radiators have been used, showing that they have been installed in some of the most important buildings in the largest cities in Canada. Upon application mentioning DOMESTIC ENGINEERING a copy of this catalogue will be mailed to those in the trade who may be interested.

Ottawa

JOURNEYMEN ENDORSE MAYOR.

At the last meeting of the plumber union on November 27 a requisition praying for the removal of the disqualification of ex-Mayor Morris was presented and every member signed it. Messrs. Proderick, Duncan and Kerr were elected delegates to the municipal convention on December 6.

ASK FOR TENDERS.

The Department of Public Works, Mr. Fred Gelinas, Secretary, will receive tenders until Friday, December 20th, for supplying and placing in position a heating apparatus at the Public Building, Rossland, B. C., according to plans and specifications to be seen at the office of the Department of Public Works, Ottawa, at the office of Wm. Henderson, Victoria, B. C., and at the office of R. W. Gregor, Clerk of Works, Rossland, B. C.

Tenders will not be considered unless made on the form supplied, and signed with the actual signatures of tenderers.

An accepted cheque on a chartered bank, payable to the order of the Minister of Publiq Works, equal to ten per cent. (10 p.c.) of the amount of tender, must accompany each tender. The cheque will be forfeited if the party decline the contract or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

SAD ACCIDENTAL SHOOTING.

One of Ottawa's most enterprising and best known business men, John W. McRae, shot himself instantly dead in his office in the Bell Telephone Building on the morning of November 29, while cleaning a revolver. The ball entered below the chin and came out at the top of the head. Mr. McRae was in the best of health and spirits when he went to his office in the morning. After attending to some letters and talking with his confidential clerk, Mr. H. H. Williams, Mr. McRae said his son Jack was going up to the mine and would want his gun and he would clean it for him. He removed four cartridges and went into the wash room to clean the weapon, when a report was heard and one of the clerks rushed in to find Mr. McRae lying on the floor dying, blood oozing from his head, the revolver at his side. Before medical aid could be secured, life was extinct. Mr. McRae was one of the original promoters of the Ottawa Electric Light and Street Railway Companies, and had lately been engaged in promoting the Consumers Electric Co. He was largely interested in mines. He was a prominent Conservative. The pistol was a heavy Mauser of large calibre. Mr. McRae had taken out four bullets and thought the magazine was empty.

Montreal.

MAKES SENSATIONAL CHARGES.

At a meeting of the Montreal city council on the afternoon of Monday, December 2, sensational charges were presented against Mr. Dore, the city's sanitary inspector. The mayor read a sworn statement from Mr. Temore, a notary, charging that Mr. Dore had given several thousand dollars to secure his position in the city's service. A letter was read from Mr. Dore denying the charge and the inspector at once swore out a warrant for the arrest of his accuser on a charge of perjury and defamatory libel. Temore was brought up in the police court, pleaded not guilty and was released on bail. It is expected the council will hold an investigation into the charge.

WATER WASTE STOPPED.

The city of Montreal has been invsetigating the uses made of the city's water supply and finds many which are unauthorized and not paid for. Meters are inserted with great benefit to the city's revenues, first in cash payments for water used and later in reduction in use of water formerly not paid for. The last report of Superintendent Janin covers a period of twelve months ended Oct. 31, during which time 36,066 dwellings were inspected and 2,550 defective fittings were discovered, which wasted on estimation 43,562 gallons

of water each hour. Supposing these fittings were out of order for a fortnight it would mean a waste of 15,000,000 gallons of water, which at the cost of 2½ cents a 1,000 gallons would cause a money loss of $1,300.

This simple process of calculation serves to explain how great must be the annual loss which the city suffers from the distribution of water. The report draws attention to the impossibility of discovering all the leakages, but declares that the moral effect must far surpass the actual money saved, which in cold figures would mean the difference between $3,707 collected and $3,482 paid out in wages for the inspectors.

Quebec.

MUCH WORK BEING DONE.

The Quebec water works are placing new mains in many of the streets.

MR. WALKER RECOVERS.

Mr. John Walker, one of our oldest and most esteemed plumbers, has recovered from a prolonged illness.

OUTLOOK FAVORABLE.

Quebec plumbers and steam fitters report a very successful year and are now finding time to enjoy the fruits of their work according to their various inclinations. Most of them are working but half time, or in other words, have just about half the usual number of journeymen working. The outlook for the coming year is most favorable as contracts are being or will be given for many first class jobs.

Winnipeg.

SHUT DOWN FOR CLEANING.

The valves and springs of the pumps at the new water works became so coated with lime that it was necessary to shut them down and connect the old water works system. After everything had ben cleaned and put into shape the new works were again connected. The softening plant, which was turned off about a fortnight ago, was also again connected.

TENDERS FOR SUPPLY OF SEWER PIPE.

Sealed tenders, addressed to the Chairman of the Board of Works, for the supply of 4,000 feet of sewer pipe and a quantity of traps, bends, slants and junctions will be received at the office of the undersigned up to 8:30 p. m. Thursday, December 12th.

Specifications and forms of tender may be obtained at the office of the City Engineer.

Each tender must be accompanied by an accepted cheque or cash deposit for the sum called for in the form of tender supplied, which will be subject to forfeiture in case of failure on the part of the contractor to enter into a written contract, with approved sureties, if called upon to do so.

The city reserves the right to reject any or all tenders or to accept any bid which appears advantageous to the City of Winnipeg. J. C. BROWN, City Clerk.

City Clerk's Office,
Winnipeg, Dec. 3, 1901.

OUTPUT FOR YEAR SOLD.

The American Sanitary Supply Company, whose factory is on Bay Way Road, Elizabeth, N. J., say they have enough orders in right now to keep them going full handed for nearly a year. They manufacture a line of enameled bathtubs and other sanitary articles. Their factory at Elizabeth is equipped with the latest improved machinery for the manufacture of the articles they put on the market.

WHAT DO YOU DO WITH YOUR TRADE PAPER?

BY ALBERT STRITMATTER.

One of the marvels of the nineteenth century just passed was the specialization of all industries. The work of the blacksmith, machinist and every branch of labor has been specialized and even each trade has been divided and each part of it specialized. Among the most wonderful specializations has been development of the trade paper. Who would have thought a hundred years ago that a paper devoted to one trade or to one branch of a trade would be successful and profitable? Now every trade has a number of such periodicals devoted to its interests: quarterlies, monthlies, weeklies and dailies; good, bad and indifferent. What becomes of these vast quantities of magazines and papers? What do you do with yours?

The good trade paper of this day covers many departments. There is the portion devoted to general news of the trade. Another details and illustrates important installations or the latest improvements in which the trade is interested, most papers regularly giving a list of recent patents granted in the particular branch of industry in which they are interested. Then there is the market news, giving the fluctuations in prices, production and consumption of raw materials as well as finished products. Last, but not least, are the advertising columns.

It is a common saying that the art of advertising is becoming so developed that the advertising pages of literary magazines are as interesting, if not more so, as the pages of reading matter. Somewhat similiarly, the advertising pages of the trade journal are of interest, for if read carefully and in conjunction with the reading matter describing new or improved machines, they will prove of intense interest and profit by calling to the attention of the reader improved machines and methods in which he should be interested. All of this various matter is of value not merely for the present, but for future reference. No one in a school or college ever thinks of throwing away the books or lectures used to-day, but these are kept for future reference since it is impossible for all to be memorized and retained, even in substance. The same should hold true of trade journals. The best of them should be kept for reference. But most men say: "Oh, I haven't time to read them when they are new, let alone when they're old." But if by reading one or two of the best of these papers it increased your ability to be a successful business man, would it not pay to take the time?

Where do most of these journals go? Most of them, I regret to say, to the waste paper basket and thence to the boiler-room to help make power. I believe that one of the best things a firm can do for its employes is to place such periodicals at the disposal of its workmen. These papers should be placed on files in the shop or some place where the men can get them, take them home and read them. Of course, there is only a small proportion of the workingmen who would take advantage of the opportunity, but this method of placing the papers where they can be read if the men wish to will encourage any inclination that may already exist. The slight expense incurred will be repaid again and again by the increase in general intelligence of even the few who do read the papers. A great many firms have office files where these papers are placed until the advertising bills are checked up. After several months or a year of accumulation in these files, the papers are taken to the boiler-room to be burned up. Recently in going through an engine room, where this custom is in vogue, the engineer said to me: "Come over here and see my library." I went over to another part of the room and there were several large piles of trade papers which he had selected from those sent out to be burned. He was greatly pleased with his 'library,' and said he was getting a great deal of valuable information from it and was ashamed to throw it away. The knowledge gained by this man from these papers is every day being returned to his company in the more efficient services rendered by him. But for his own ambition to learn, even though an engineer of about 20 years' experience, these papers would have been wasted.

In one city of Ohio there is an association of mechanics of all trades, the association being opposed to unions and its object being to increase the intelligence and efficiency of its members. Several of the manufacturing concerns in that city are sending their trade papers to this association, thus helping themselves by giving reliable and instructive reading matter to the members. In one of the State universities of a central State is a professor of economics, who makes it one of his duties to secure from business firms in that city trade journals relating to all subjects. He is accumulating for his department a vast amount of information on subjects relating to banking, all sorts of wholesale business, manufacturing plants, etc. I believe he has been one of the first professors to advocate a course in business training in the great universities and colleges.

Where do we get our most reliable news on the markets? From our trade publications. Do you believe all of the news in the daily papers regarding the great steel strike now on? No, you turn to your iron and steel journals and secure the latest and most truthful information that it is possible to obtain, knowing that it has been secured by men who know the details of the business and who are not catering to the popular demand for sensational articles, but who are desirous of obtaining and publishing the whole truth, just as it is. Where do you look for information as to how to improve your plant or methods? Again you turn to your trade journals. If your trade mediums are valuable to you, why would they not be so to your employes? At least it would cost but little to give this opportunity of learning to such as will do so, instead of consigning the papers to no further usefulness than to start the fires under your boilers.—American Manufacturer.

YE FOOLISH PLUMBERS.

The following incident illustrates the extent to which the plumbing business is demoralized by "cut rate" plumbers:

A solicitor for a firm of plumbers called upon an architect recently to ask for a share of his jobbing work.

"Do you people pay rent for the premises you occupy?" asked the business man.

"Of course we do," replied the solicitor.

"Do you employ competent men to do your work?"

"Do you give them fair wages?"

"Yes."

"Do they get their wages every week?"

"Of course they do."

"Do you pay for your pipe and other materials?"

"Yes, we do."

"Then you can't afford to do my work. The people who are doing it at present must get their labor for nothing and must steal the material.

Southern Notes.

GOES TO ASCHAFFENBURG & CO.

Mobile, Ala., Nov. 14.—The contract for the heating of the Cathedral of the Immaculate Conception in this city by means of steam has been awarded by Bishop Allen to the plumbing firm of A. Aschaffenburg & Co., of New Orleans. The work will begin at once and will require four weeks for its completion. The cost will be $3,075.

DENIES THAT HE USED HAMMER.

Macon, Ga., Nov. 15.—W. P. Bennett, a plumber, who it is claimed assaulted James Daly, a sanitary inspector, and who was fined $25 and bound over to the city court in the sum of $200 by Recorder Freeman, paid the fine and gave bond.

Bennett states that but one side of the case has as yet been presented and he will certiorari to the higher courts, where his defense will be made.

The defendant in this case denies that he struck Daly with a hammer, but used his fists alone and was provoked and aggravated to such an extent that such an action became necessary.

BIDS FOR HEATING CADETS' QUARTERS.

Baltimore, Md., Dec. 1.—Bids were opened Thursday by Rear Admiral Crowninshield, chief of the Bureau of Navigation of the Navy Department, Washington, D. C., for the construction of the cadets' quarters at the Naval Academy, Annapolis, Md. A Baltimore firm—Crook, Horner & Co.—made the lowest bid for heating and ventilating, namely $75,000. E. M. Noel, of this city, was, likewise, the lowest bidder for the building complete; $2,448,000 being the figure placed by them.

Other bids were made for the heating and ventilating by Leghorn & Co., Boston; Roberts & Lainau, Boston; and D. Rutzler, New York; these running from $77,345 to $99,650.

PLUMBER IN TROUBLE.

Parkersburg, W. Va., Dec. 1.—W. G. Franklin, proprietor of the Franklin Plumbing company, spent last night in a cell as the result of a scene in which he and Mrs. Fannie E. Ihrig, "the oil queen," figured last evening. They came down the principal street together, and when Mrs. Ihrig reached the Fifth street entrance to the City building she fled from Franklin and sought police protection. Franklin followed, and in the lobby of the building, Mrs. Ihrig claims, grabbed her by the throat and was trying to choke her to death. Her screams attracted the attention of two policemen, and Franklin was arrested. When searched, a piece of lead pipe about 18 inches long was found on his person. Mrs. Ihrig claims Franklin was jealous of her and had threatened to beat her with the lead pipe and throw her in the river. Mrs. Ihrig has a large income from oil properties and is among the wealthiest residents of the city. She and Franklin were convicted upon a statutory charge several months ago, and the case was appealed.

SHORT STRIKE ENDED.

Charleston, S. C., Nov. 27—A strike of short duration was brought to an early finish here this week when the twenty-four members of Local Union No. 237 of the United Association of Journeymen Plumbers went on strike to obtain recognition of their demands on the employing plumbers. Some time ago they submitted a petition to the Master Plumbers' Association of Charleston, and on account of the failure on the part of the Association to give them an answer to their proposition at the time set the journeymen went on strike.

The following is a copy of the petition containing the workmen's proposition submitted to the Master Plumbers:

To the Master Plumbers' Association of Charleston, S. C.—Gentlemen: The members of Local 237, of the United Association of Journeymen Plumbers, Gas Fitters and Steam Fitters, respectfully petition the Master Plumbers' Association to grant the requests embodied in the folowing agreement:

Agreement between the Master Plumbers' Association and Local 237, of the U. A. J. P., G. F. and S. F., to be put in effect as hereinafter provided for:

Article 1, Section 1. That a day's work shall be of (9) nine hours' duration, from 7 a. m. to 12 m. and from 1 p. m. to 5 p. m., except Saturdays, when the hours shall be from 7 a. m. to 12 m. and from 1 p. m. to 4 p. m.

Article 2, Section 1. That in shops where apprentices are employed the term of apprenticeship shall be four years.

Section 2. That upon the completion of the four years of apprenticeship that a term of one year, six months, shall be served as a junior plumber.

Article 3, Section 1. That none but members of the United Association work upon plumbing, gas fitting or steam fitting.

Article 4, Section 1. That the pay of a junior plumber shall not be less than $2 per day and a senior plumber not less than $3 per day.

Article 5, Section 1. That on all work out of the city all expenses incidental to travel, board, etc., be paid by the master plumber.

Article 6, Section 1. That all time worked before 7 a. m. and after 5 p. m. for the first five working days of the week, and before 7 a. m., and after 4 p. m. on Saturday, be paid for as overtime, and that all legal holidays, viz., New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas and Sundays be paid for as overtime.

Section 2. That all overtime be paid for as time and a half, except Sundays and legal holidays, which shall be paid for as double time.

Article 7, Section 1. That a conference board, composed of three members of each organization, shall be appointed, who shall use all honorable means to settle all matters and disputes, and who shall report their decision to their respective organizations for their action.

Article 8, Section 1. This agreement to be put in force on November 21, 1901, to be in effect until and inclusive of November 22, 1902.

Article 9, Section 1. This agreement to be signed in duplicate and a copy to be filed with each association.

Inasmuch as a very large majority of Charleston plumbers belong to the union the Master Plumbers were occasioned no little inconvenience and vexation. Work of this kind at the Exposition grounds was practically suspended and other jobs about town made little or no headway. At first the Masters proposed to put up a stubborn fight, but after several days of idleness Masters and journeymen managed to get together on a mutually agreeable proposition. While the terms of settlement have not been given out it is understood that the journeymen won their contention that hereafter only qualified union workmen should be employed on plumbing work. All of the journeymen have been given their old places and peace once more reigns in plumbing circles.

THOS. P. WATTS WILL EAT HIS HAT.

Louisville, Ky., Nov. 20.—Everybody knows genial Thos. P. Watts, of Louisville, and the craft is watching with much interest the outcome of a self-imposed penalty for failing to pick the winner in the fall election. Along in September Watts was so sure that the Republican ticket would be elected that he wrote out a promise to eat his old straw hat in case the election did not go his way, and signed it in the presence of witnesses. Now history has it that for once Watts was wrong and it's up to him to live up to his promise. Bets are about even that he'll never finish the hat,

but no one doubts that he will make the attempt. Of course, he could get out of it legally by saying that there was nothing at stake for the other parties, but that isn't his style. Someone suggests that the hat be prepared by one of Louisville's famous cooks and served as follows:

Soup.
Old Straw.
Entrees.
Fricassee of Straw. Ragout of Straw.
Straw Hash.
Salad.
Straw, with Pitchfork Dressing.
Dessert.
Straw Pudding, with Old Braid Sauce.
Sulphuretted Water.

me folks say that straw isn't the most deli- tful diet in the world, but Watts is game and says that he has eaten tougher things in Louisville restaurants than an old straw hat.

BIDS OPENED FOR GOVERNMENT WORK.

San Antonio, Tex., Nov. 23.—Bids were opened at the chief quartermaster's office, department headquarters, last week for doing plumbing in the houses and barracks of the upper post. The contract is one of the largest ever given out in San Antonio and to complete it will require about five months. It calls for the placing of baths, wash stands and closets whereever named in the specifications. Connections must also be made with the city sewers. When the work is completed the officers' quarters and barracks will be sanitary in every respect. The buildings in the lower post are already equipped.

There were four bidders for the contract. The lowest bid was that of W. G .Schuwirth, who agrees to do the work as specified for the sum of $14,435, in 135 working days. The bids of other bidders were:

A. H. Shafer, $14,600, no time mentioned.

Ed. Braden, Jr., $15,000, five months to complete work.

J. A. Gutzeit, $15,015, no time mentioned.

Chief Quartermaster Clem will recommend that the contract be awarded to Mr. Schuwirth. After the approval is received from Washington work will be commenced immediately.

NEW WATER SYSTEM FOR NEW ORLEANS.

New Orleans, La., Nov. 26.—After many months of costly experiments engineers have just announced that the waters of the Mississippi River, through sedimentation and filtration by a new and comparatively inexpensive method, may be transformed into clear water, serviceable for all purposes, and as pure and much safer from contamination than the best natural supplies.

Bacteriologists assert that the disease germs left in this water after it has been so treated are too insignificant to be taken into consideration.

As a direct result of these experiments New Orleas will shortly begin the construction of one of the finest water works plants in the world, which will cost $4,000,000. The pipe line system will cover nearly 500 miles of streets. All the Mississippi River cities are expected to follow New Orleans when the results of the experiments are known

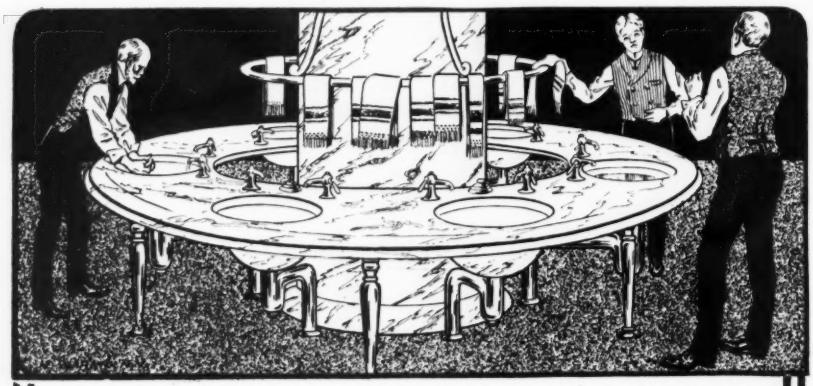
When New Orleans undertook a year ago to investigate the purification of Mississippi water it was certain the task could be successfully accomplished within reasonable cost. Cincinnati and Louisville investigations had proved that much.

There was erected a complete laboratory and four perfect water purification systems. These four systems were operated continuously from December, 1900 to August, 1901, and the exact condition of the water, both chemically and biologically, as it entered each system, and at every stage of its passage through each system, was recorded.

Records were also kept of the periods of subsidence, of the amount of coagulant used, of the length of service of each filter, and the amount of water handled at each period, of the depth of scrapings and conditions of sand layer on slow filters, and of the amount of wash water, etc., on the rapid filters. Periods of plain subsidence from three up to six days were tried with slow filtration, unaided by coagulation, but never resulted in a perfectly clarified effluent.

The most economical results were obtained by twelve hours of plain subsidence and from twelve to eighteen hours of auxiliary subsidence after coagulation and the rapid filtration through sand. After this the water is to pass directly to the high-lift pumps, which will send it into the city distributing system or to reserve clear water reservoirs.

General Superintendent George G. Earl of the Sewerage and Water board, who first suggested the necessity of the investigation, says a water purification and pumping station for New Orleans, designed to purify and deliver into the city distribution system 40,000,000 gallons of water a day, will cost but little more than $1,500,000. The amount of mud taken from this water will be 100 cart loads a day The new water works system, entire, will cost little more than $4.000,000.



"BENEDICT-NICKEL" For High-Class Exposed Plumbing.

It does not readily tarnish.

It takes as high a polish as the best nickel-plated work and retains it for a long time.

No matter how much it is rubbed, it never wears brassy—being white metal clear through. "Benedict-Nickel" never has to be renewed.

If you have on hand a job of fine plumbing, do not use ordinary nickel-plated brass tubing, as the nickel will wear off in time and give the work a very unsightly appearance.

Use "Benedict-Nickel"—your work will reflect credit on you as long as the plumbing itself lasts.

We can furnish seamless brass and copper tubing to those who desire it, as we are among the largest manufacturers of the same.

We have a useful book of Tube Sheet and Wire Tables which we will be glad to send on request.

BENEDICT & BURNHAM MFG. CO.

Mills and Main Office, Waterbury, Conn.

NEW YORK, 253 BROADWAY BOSTON, 172 HIGH STREET

PLUMBING COMMISSION NAMED.

Jacksonville, Fla., Nov. 10.—The board of bond trustees has announced the appointment of the board of plumbing commissioners, as authorized by a recent ordinance of the city council. The ordinance provides that all plumbing in Jacksonville shall be done under the control of the commissioners, who shall consist of three citizens. The plumbing inspector is under the supervision and control of the said board of plumbing commissioners. The board of bond trustees appointed R. L. Ellis, Philip Prioleau and F D. Miller to comprise the board, subject to the approval of the city council.

NEEDS OF MANILA.

The work of taking over the office of city engineer, with all the property connected therewith, has kept Captain Mead too busily engaged to make plans for the operations of his department.But in an interview, yesterday, he discussed some of the needs of the city and outlined the likely ways of meeting them.

"The present water supply," he said, "is taken from the Santolan, or Sanata Mese river, as I believe it is called at that point. The capacity of the system is not half what the city should have. The water is pumped from the river into an open canal, which carries it part of the way and then runs it into a closed aqueduct. This takes it on to El Deposite, the reservoir. Gravity does the work, from the time it leaves the pump at the river till it reaches its destination at Manila. There is but sixty feet fall from the reservoir to the city, and that doesn't give force enough to throw water to the tops of the high buildings—a serious disadvantage in case of fire, and often a great inconvenience in getting water for ordinary uses on the upper floors of houses.

"A strong argument in favor of going to the canon for the water supply would be that it is above all villages which pour their refuse in the stream. From an engineering standpoint the plan is feasible, but the cost has not been estimated.

"Perhaps the most urgent need the city has is a sewerage system. Of course, there are some big problems to be solved in connection with the matter. The flatness of the country will preclude the adoption of a gravity system, but it is not an insuperable difficulty. It could be readily overcome by the Schon pneumatic system, for instance, which has been found to work well at Rangoon, India, and gave satisfactory results in the Chicago world's fair, where it was adopted for draining the grounds and buildings.

"That system consists of large air-tight tanks or reservoirs, into which the sewage is run by gravity through short lines of pipe. When the liquid in the tank rises to a certain height automatic valves close the supply pipes, a float opens a large valve at the top, which admits air under pressure sufficient to raise the contents into pipes, which are high enough for it to run off by force of gravity.

"Of course, the city would have to be divided into many small districts, each to be served by a tank. There would be, say, two or three in the Intramuros. And the sewer system on one side of the Pasig would be practically separate from that on the other. But the air for all could be compressed at one power house, located in the suburbs.

"The disposal of the sewage would be a matter for discussion and investigation of the subject.

"There is one feature of the problem in this city which has probably not been encountered elsewhere, and that is the floods of water which result from a combination of heavy rains and typhoons on the bay, backing the water up until it covers the outlets and fills the sewers."

THE ASSOCIATION OF MASTER PLUMBERS OF THE ATLANTIC COAST.

THE above was the name adopted by the fifty delegates from Delaware, Maryland, Virginia and the District of Columbia who assembled at Norfolk, Va., on the 9th instant for the purpose of organizing themselves for self protection in concert with the several other associations of master plumbers throughout the states, by the organization of one grand quadruple state association.

Promptly at 9:30 a. m. Mr Jas. F. Traynor, of Wilmington, Del., sounded the gavel, and little he surmised that in doing so he was sounding the bugle for a "hot old time." After a few brief remarks stating the object of the gathering the election of temporary officers took place with the following result: Chairman, W. H. Barnard, of Norfolk, Va.; Seretary, Wm. J. Kelley, of Baltimore, Md.; Assistant Secretary, Harry A. Miller, of Wilmington, Del., and J. R. Guy, of Norfolk, Va., Sergeant-at-Arms.

Upon assuming the duties of the chair Mr. Barnard in well chosen and appropriate language, and in a manner that was most highly agreeable to those assembled, extended to the convention the key to the city, which was accepted in a brief but eloquent response by Mr. Traynor, of Baltimore. Mr. Barnard, in his remarks, referred to the object of the meeting and explained fully the importance of their organization.

The reports of the several committees were received and adopted until that of the committee on laws, resolutions and the framing of constitutions was reached which brought forth a quite lengthy and at times somewhat heated debate. The report was finally laid on the table temporarily to dispose of the routine business of the convention, which subsequently adjourned without final action on the report until at the adjourned meeting held in the parlors of the Monticello Hotel which were kindly tendered to the convention by the ever accommodating and popular proprietor, Mr. Sylvanus Stokes. The constitution as originally framed by the committee was then unanimously adopted, after which the election of permanent officers took place with the following result: President James F. Traynor, of Wilmington, Del.; Vice President, Lloyd Mitchell, of Baltimore, Md.; Recording and Financial Secretary, J. S. Eaton, Wilmington, Del.; Treasurer, W. H. Barnard, of Norfolk, Va., with the following Executive Committee: Messrs. E. L. Guy of Norfolk; W. A. Rothrock, of Baltimore Md. and W. D. Nolan, of Washington, D. C., all to serve for the ensuing year.

The election over, general remarks for the benefit of the organization were indulged in and votes of thanks plentifully bestowed upon Managers Stokes and Davis of the Monticello and Atlantic Hotels, respectively and upon the several committees having in charge the arrangements for and reception of the delegates. Although strictly pleased with the "City by the Sea" and the universal display of genial "Southern Hospitality" (which was largely partaken of) and after an expression of regrets at not being able to meet in Norfolk another year, because of a desire to distribute the good fellowship that prevailed in the general interest of the association, the selection of the place for next year's meeting was left to the discretion of the Exeutive Committee, several invitations having been already extended and received by the committee for their future consideration.

While the business and transactions of the convention were conducted largely behind closed doors, there were other features connected with their stay in Norfolk which were not so closely guarded. That southern hospitality which has made Norfolk famous as a convention city, and the participation in which leads the most sedate to sing "You may go but this will bring you back" was in evidence.

There are three master plumbers in Norfolk going by the respective names of J. J. Lawler, J. S. Odend'hal and C. L. Foster who constituted themselves into a Committee on Entertainment, and to say that their efforts were the targets for many a cartridge of contentment but mildly expresses it.

They intuitively conceived that an oyster roast and a good day's outing, with plenty of fresh sea air, would prove conducive to sending their guests homeward bound in "good spirits" which was accordingly so done.

It required a special train to leave Norfolk at 10:30 a. m. with the jolly victims and after an half hour's ride a stop at the spacious and magnificently furnished "Plumbers Club," situated on the windy shore of Little Bay, an adjunct to the historic Chesapeake, beneath whose placid bosom the most lucious bivalves, known especially to jovial Joe Odend'hal, were in waiting just for the express purpose of soothing the ravenous appetites produced by a few but pleasant moments spent with Lilie Guy and Jeff Carey in "sight seeing."

It would require volumes to relate all that transpired at that oyster roast and it is not our purpose to do so for the popularity of DOMESTIC ENGINEERING is a well established fact and it may be read by other members of the family who were required to stay at home.

But there were several there who especially added to the enjoyment of the day and without whom the day would not have appeared complete.

There was our jolly President, Mr. Jno. Traynor, of Wilmington, who, by his natural good fellowship endeared himself forever in the hearts of all. Then there was John Heyl, of Washington, who amused the entire party with his German dialect and especially by the rendition of his original song "Katie, Does the Bath Tub Leak?" Harry A. Miller, of Wilmington, Del., was also there and we didn't see him lose an oyster. Henry Allen would have favored the boys with a song but Joe Odend'hal, Lilie Guy, Tom Carey and Syl. Stokes proved themselves such an accomplished quartette that he didn't get a chance. Henry C. Rossbach, of Baltimore, was there with his new automatic "Beer Pump" ready to give an exhibition of its wonderful mechanism but the opportunity didn't seem to afford itself. Was Joe Phillips of Richmond there? Well! I guess he was and may be you don't think Joe had a good time. Joe is about the only survivor of the late "Merrimac" and it was only after the most earnest persuasion that he related the "blood-boiling" incident connected with her blowing up. Joe is an ever welcome visitor to Norfolk, but his visits are too few. Our friends, Edwards, of Lynchburg, Quinter, of Washington, and Cunningham and Simon of Wilmington, Del., were almost too busy eating to pay much attention to John Randall's version of the "Sly" controversy. Brother Riley, from across the River, closed up shop to attend and as a result every water pipe in Portsmouth was leaking.

But the hours soon put a stop to the enjoyment, as time usually does on such occasions, and the happy party began to separate, a major portion leaving for Old Point Comfort (a good place after such a frolic), where they caught the Washington and Baltimore steamers for home. The balance lingered until the eleventh hour, when they took the toast to their absent brothers and their finishing everything that was intended to exhilerate the inner man, boarded their special car which was in waiting, and returned to the city filled to the brim, of course we mean with good things, for that was all to be had.

Especial praise is due Messrs. Lawler, Odend'hal and Foster for the masterly and complete manner in which they performed the pleasant duties imposed upon them as Entertainment Committee, and the universal remark was "One of the best times we ever had." To this we can only reply, "Come again, boys, you're always welcome."

WASHINGTON PLUMBERS ELECT OFFICERS.

Washington, D. C., Dec. 12.—At the annual meeting of the Master Plumbers' Association, held December 3, the following officers were elected for the ensuing year: President, Walter D. Nolan; first vice president, Joseph A. Herbert; second vice president, Daniel J. Murphy; recording and financial secretary, William Koch; treasurer, Ed. J. Hannan; sergeant-at-arms, Charles E. Barrick. Delegates were elected to attend the convention of master plumbers, which is being held this week at Norfolk, Va.

The annual banquet of the association will be given at Freund's, Monday, December 16, 1901.

THINKS CITY SHOULD HAVE PLUMBING INSPECTOR.

Birmingham, Ala., Dec. 12.—"Good Citizen," writing to the *Ledger* urges the appointment of a city plumbing inspector on the following grounds:

I would respectfully ask to present some reasons why the city should have a plumbing inspector. Sewer gas is a deadly poison. This poison is breathed nightly by thousands of our citizens, thereby creating disease of every character, increasing through its deadly fumes the death rate of our otherwise healthy city.

Now as a good citizen I ask that the remedy be put in use. I might cite and can cite the people to hundreds of homes where kitchen sinks, bath tubs and water closets without number have no traps under the fixtures, thereby allowing the germ infected odors that arise from the main sewer to permeate the houses. I have in mind one case in particular on Morris avenue, where some time since a plumber was called to clean a sewer. He found to his astonishment that this sewer which had been in use for a long time had really never been connected with the main sewer; in fact, lacked five or six feet reaching same, yet this work had been pronounced O. K. I realize that much of this shoddy work was done when the "great boom" was on. We could and did look over many things in those hurry times which now for the health and happiness of our crowding and hustling thousands we cannot afford to overlook. Those who have invested their capital here have done so through the natural supposition that the city authorities would exert themselves that tenants would be protected from such evils.

RECIPROCAL TRADE WITH CANADA.

A Paper read by Mr. Geo. T. Coppins, Secretary of Walworth Mfg. Co., Boston, before the National Reciprocity Convention at Washington, Nov. 19-22.

THE question of the United States making reciprocal trade treaties with foreign nations easily divides itself into two propositions: First, treaties of trade with the people of the American Continents; second, trade treaties with those who may be fairly expected to be large purchasers of the various classes of merchandise that we have to sell.

It has been the traditional policy of our government to consider all American questions as quite separate and distinct from questions which relate to the Eastern hemisphere. This classification has been due to the obvious requirements of our Monroe Doctrine. While we have always respected the political independence of our American neighbors, we have realized that we were bound to them, and they to us, by ties entirely different from the relations of amity and good will which have subsisted between us and the nations of the Old World. With the international complications of the latter we have been merely interested spectators, holding that their successes or failures did not greatly concern us; but with our neighbors of the New World no such aloofness or indifference has been possible, for the reason that enlightened self-interest has warned us, that their external troubles might easily lead to some form of intervention by one or more of the great powers of Europe, which would call upon us for the exercise of that American primacy uopn which our well-being as a free, and in the main, non-warlike republic chiefly depends.

For this reason it has been the policy of American Statesmen to endeavor to draw the foreign nations of the New World to us by such inducements as would give them cause to believe that their interests were closely bound up with ours, and that in intimate relationship with us, they could readily afford to forego the seeming advantages that would come to them through close, but possibly hazardous, associations with great powers of the Old World.

It is everywhere recognized that there is no means by which the people of two countries can be more easily drawn together than by establishing between them intimate trade relations. By this method each learns to know and appreciate the other in a way not otherwise possible; and as through the medium of trade friendships are created, these when widely extended tend to powerfully, if silently, influence national policy in a manner favorable to both countries. Thus for many years past it has been a settled feature of American policy that some forms of trades union between the people of the American countries would be not only of industrial advantage to us, but also a decided element of national safety.

It is true that those who have urged this action have usually had their eyes turned Southward rather than Northward; to our Latin rather than to our Anglo-Saxon neighbors; but this has been because they have not realized to the extent that they should, that our interests are as nearly—yes more nearly—touched by the future of Canada, than by the possible future of any South or Central American State. To all intents and purposes the Canadians are an independent, as well as a free, people. They are, it is true, under the shelter of Great Britain; but in these days of imperial aggression and revolutionary changes, who can tell how long this shelter will be a sure defense? In the last analysis of the problem we are as much bound to protect Canada against possible interference coming from the military powers of Europe, as we are Honduras or Venezuela. If it is desirable for high national reasons to establish a lively sense of the unity of American interests throughout the two continents, it is just as essential for the harmonious development of this policy that Canada should form a part of it, as that Brazil should be included. The Canadians are just as firmly lodged in North America as we are. They are to be with us, or against us for all time. They are the one American people who have had their ways of life largely influenced by the examples which we have set for them. If future national interests should favor a policy of peaceful territorial extension by the United States, there is no addition that we could make which would give us anything approaching such advantages, as would come from a union with Canada. There is no logical escape from the conclusion that Canada should be included in any scheme of trades union which is based upon Pan-American necessities.

What has thus far been said refers to the policy of making reciprocal trade treaties which have other reasons besides trade advantages for their existence—treaties where diplomatic ends are brought about by business means.

Our South and Central American neighbors could no doubt buy of us much more than they have; but for social, climatic and industrial reasons they are not, and are never likely to be, large consumers of imported wares. To say that the average American consumes in a year ten times more of the products of industry than the average inhabitant of South America, would be to underestimate the consumptive powers of the former; hence if we sold to our neighbors to the South of us, everything that they bought from the outer world, the trade, considering the number of the people, would not be a large one. In making a trade treaty simply for the purpose of trade it is in a high degree desirable that it should be made with a country whose people are large purchasers. We wish to sell, as the result of a trade treaty, not merely a few million dollars worth of our goods; but scores of millions of dollars worth, as these large sales are intensely stimulating to our home industries. There are only a few great purchasing nations. England, Germany and France lead the list; but so far as our trade is concerned, Canada takes the third place, and in spite of her limited population of 5,500,000, she bought of our products last year $20,000,000 worth more than France did. These four national purchasers bought during the last fiscal year of the United States, goods to the value of approximately $1,000,000,000. In other words their purchases represented quite two-thirds of our entire export trade. Clearly if we are to safeguard the trade that we have, by taking such steps as are necessary to prevent foreign legislation that is hostile to it—to say nothing of increasing our trade—it must be primarily with the countries just named that our negotiations must proceed. They are in a position to do us, if they choose, serious industrial harm; while adverse tariffs framed by countries which buy of us each year only a few million dollars worth of our goods, may not occasion genuine alarm.

Of the countries named, Canada, considering the number of its people, is our best customer. The Canadians bought of us last year goods to the value of $20 per capita. The entire per capita foreign purchases of the people of the United States were hardly more than half the sum that the Canadians bought of us. This is a record of foreign patronage unparalleled in the trade history of the world. Surely a nation that possesses such an astonishingly good customer cannot afford on the broad principles of trade to adopt any policy which threatens to drive him away.

But these large Canadian purchases are not the only considerations to be taken into account. These neighbors to the North of us, bought last year more of our products that are classed as manufactured goods than any other nation in the world. Nearly two-thirds of all the merchandise that we sold to them came under that classification. It hardly needs to be explained to this assembly, that this is the most profitable species of trade that a nation can possess. It is well to sell wheat; it is better to sell flour. It is well to sell pig iron and steel billets to a foreign people; it is better to sell them tools, hardware, machinery and various other iron and steel commodities ready for immediate use. This latter class of trade implies that the different raw materials have passed in this country through the processes of manufacture, have paid their toll in the form of wages and profits to American labor and capital, and when ready for use, needing only transportation to carry them to their users, have found their purchasers in a foreign country.

One of the chief reasons for our marvellous success in Canada is, that we do not need, as is frequently the case in foreign trade, to adapt our manufactures to the peculiar and dissimilar needs of an alien people. Our tastes are the Canadian tastes; what we think suitable for our own use, is entirely acceptable to them; it is Dollars and cents not L. S and D. or Francs or Marks or Kroner, hence there is no necessity for the American manufacturer, who wishes to find a market for his output in Canada, to change or qualify the character of his ordinary product, or to base his terms of sale on any other currency than our own. The advantages of a foreign trade of this character are too self-evident to need further explanation.

Again our trade with Canada is almost the only foreign trade we have in which the banking profits of exchange are directly beneficial to American Capital. In our trade intercourse with the Dominion the banking facilities of London play no appreciable part. In this instance the questions of exchange are purely American questions with all of the financial benefits which such a possession implies.

It is interesting to make an analysis of what we sell in Canada, which can best be done through the official trade reports of the Canadian government, for our exports statistics include not only what is sent to Canada for consumption there; but also exports which are sent through Canada to Europe. The Canadian reports thus far published are carried forward only to the close of the fiscal year ending June 30th, 1900. During these twelve months we sold of products of our mines, goods to the value of $11,600,000. Fish, $484,000; forest products, $5,200,000; animals, $3,420,000; agricultural products, $19,080,000; manufactured wares, $61,362,000, making a total of $101,146,000. During the last fiscal year these exports increased more than 10 per cent, the largest increase occurring in the department of manufactured goods. Of these we sold in the fiscal year 1900: Manufactures of metal, $27,707,000; man-

ufactures of cotton, $1,509,000; books, $1,095,000; carriages, carts and bicycles, $1,325,000; chemicals and medicines, $2,144,000; prepared provisions, $1,797,000; hats and bonnets, $844,000; electrical apparatus, $847,000; paper, $1,043,000; manufactures of leather, $1,610,000; glass, $535,000; cordage and twine, $978,000. These are but a few of a long list of American manufactures which by their large entrance into the Dominion have given the retail shops of Canada the appearance of American stores.

Of the other classes of exports there is coal which we sold to the Canadians to the value of $11,748,000; plants and seeds, $2,057,000; hides and skins, $2,128,000; raw cotton, $4,491,000; grain (chiefly Indian corn) $7,866,000; fruit, $2,288,000, and lumber and other forms of wood, $4,806,000.

These American products which find a market in Canada come from all parts of the United State. Probably of the States of the Union, Pennsylvania has led the others through her sales of coal and the manufactures of metal. The New England States, New York and New Jersey have found a market there for their cotton, metal and silk goods, their books, twine, boots and shoes and hats and caps. The Western States have sent manufactures of wood, provisions, carts and carriages, grain and a great number of miscellaneous commodities. California and Florida send thither their fruits, and the South its cotton. There is probably no foreign country that is, to the extent that Canada is, the trade tributary to all parts of the Union.

What do we take in trade exchange? Here as in the case of our sales the comparison has to be made on the basis of the fiscal year 1900. These were in value: products of the mines, $23,700,000; of the forests, $12,805,000; fish, $3,689,000; animals, $5,326,000; agricultural products, $2,041,000; manufactures, $4,857,000, making a total of $52,418,000, or about half of what we sold to her.

Of this amount about $18,000,000 worth of trade was made up of gold and silver, copper, lead and nickel ores, chiefly gold and silver, which would have been classed as merchandise if the Canadians had not sent it to our refineries to be converted into bullion. Deducting this we bought very little more of the Canadians in 1900 than we did fifteen years ago, while their purchases of us have grown three fold.

The American agriculturists who, annually sell their products in Canada to the value of more than $19,000,000 object because the Canadians find a market for their farm products in the United States to the extent of $2,000,00 a year. The American coal miners who sell the Canadians their coal to the value of $11,500,000 a year, complain because the Canadians sell their coal in the United States to the amount of $4,000,000. Is it strange that the Canadians think that the present trade conditions between the two countries are inequitable? Should we not hold the same opinion if the conditions were reversed? One-half the value of the goods which Canada imports from the United States enter the Dominion duty free. The custom tax upon the remainder averages about 25 per cent. Barring metal ores, we impose a custom tax on almost everything that the Canadians sell to us and our duty rates average about 50 per cent ad valorem.

These unequal conditions cannot long continue. Unless we can arrange some reasonable trade agreement with the Dominion, growing public opinion there, which is now greatly influencing both Canadian protectionists and free traders, will compel the government to raise its duty rates upon all classes of American merchandise to a level corresponding to that which we have in force; in which event we may expect to experience a loss in our annual sales amounting to forty or fifty million dollars.

Twenty years ago Canada was dependent upon us to supply her people with a market. Sound national policy would have distated the cultivation of this feeling of dependency. In place of this we thrust back her trade, forced her people to find markets elsewhere for their surplus products, and in this way made the Dominion commercially independent of the United States. If an impassable trade barrier was raised between the two countries, Canada could face the changed conditions with comparative ease; for her foreign markets are now established elsewhere; but with us such a stoppage of trade would mean the closing down, for want of orders, of thousands of American factories and workshops.

We cannot afford to encourage by our short-sightedness or indifference the feeling of trade hostility in the minds of our nearest neighbor and our best customer. True Twentieth Century Statesmanship consists in encouraging and building up commerce and not in embarrassing or destroying it. Our great business prosperity has been contemporaneous with our growing export trade, which has kept in constant activity all departments of productive industry, and these opportunities must in some way be maintained.

As has been pointed out, the ties which bind us in trade relations with the Canadians are different from those that connect us with any other people, they are not only, in common with us, the inhabitants of the American Continent; but they are also among our best customers. What is needed to maintain and strengthen these relations is prompt, wise and coniliatory action on the part of the national government.

Middle States.

PLUMBING BOARD MAKES CHANGES.

Grand Rapids, Mich., Dec. 9.—The law passed by the legislature last winter, creating and defining the duties of the board of examiners of plumbers, makes it necessary for the board of public works to revise and change the rules governing plumbers in the laying or water service pipes and house drains, and the board's committee on rules. Messrs. Keegan, Emmer and Bissell, held a meeting last evening for that purpose. Under the new arrangement the plumbing inspector will have control of plumbing, water pipes, drains, etc., on private property, while the board of public works will retain control of such work outside of the lot lines, in the streets, alleys and other public places. The new law does not recognize drain layers, but includes their work with that of plumbers. The board of public works will, therefore, discontinue the granting of licenses to drain layers and the board of examiners of plumbers will license them only on condition that they act under the direction of some licensed plumber, who shall be responsible. There will also be some changes in the rules relative to water rates. Heretofore many houses occupied by two or more families have been supplied by one service and charged only single rates. Hereafter in such houses, flats, tenements, etc., each separate set of fixtures used by different families will be rated independently.

DETROIT BOARD TAKES ACTION.

Detroit, Mich., Dec. 9.—In accordance with an act passed at the last session of the state legislature giving cities power to enact laws governing plumbers and plumbing, a joint meeting of the Detroit board of health and board of examining plumbers was held last evening to consider the rules which were prepared by the examining plumbers. The regulations relating to the registration of plumbers, specifying the time of apprenticeship and the qualifications necessary for master plumbers to work in Detroit or take contracts for work, caused considerable discussion, and it was finally decided to submit them to the corporation counsel before taking any action. The regulations for the guidance of plumbers and architects in making house and sewer connections were read and passed by the board without comment. It is proposed to have the rules come into effect by January 1, 1902, and all plumbers wishing to work in the city after that date will have to be registered and pay a license fee of $2 per year.

Minneapolis Letter.

RESIDENCE WORK.

Worthingham & Potter are plumbing a house for George A. Cook, 2400 Bryant avenue. Price $634.00.

FINE RESIDENCE JOB.

Fay & Mitchell are plumbing Mr. Archers' new house on 2d avenue South and 24th street.

GOOD FIGURE.

Dr. Drew's new house on Bryant avenue is being plumbed by the Minneapolis Plumbing Co. Price $760.00.

GOING RIGHT AHEAD.

Schnaith Bros., of St. Paul, have six house jobs of plumbing to do and are going right ahead with the work.

HIGH GRADE PLUMBING.

The new home going up at 2525 Colfax avenue for Mrs. Vose will be fitted with high grade plumbing by the Minneapolis Plumbing Co.

GOOD FOR YOUNG AND OLD.

H. M. Jimmerson is putting in the plumbing in the Home for Children and Aged Women on 32d street and 2d avenue. Price $400.00.

GOOD CONTRACT FOR HINELINE CO.

The six story block at 3rd Ave. and 3rd street being rebuilt for the National Biscuit Co. will be supplied with entire new plumbing by Hineline & Co., their contract price being $2,500.

GOES WITH GIL-ROL.

Harvey Watterson, city salesman for the National Brass & Metal Co., has resigned and will travel for Gillmore-Rollins Co. Harvey's successor is G. C. Malcolm, from Toronto.

OPEN WINTER FAVORABLE.

The open weather we have enjoyed up to date is a great benefit to the plumbing trade, enabling plumbers to complete many contracts that ordinarily would have been carried over to spring.

SATISFIED WITH CONDITIONS.

The trade in general is pleased to note that the soil pipe manufacturers, at their recent meting held in New York, reaffirmed the standing prices on pipe and fittings and entered into another agreement for a year. The only place our trade can look to for relief from bitter competition is the fountain head, the manufacturers associations and the so-called trusts. These bodies adopt price lists that remain as made, and which from this very fact put all jobbers on an equal footing and cause them (the jobbers) to settle upon a legitimate line of profit, depending entirely upon fair treatment for a preference instead of a lower price as formerly.

Editorial Chat.

This department is designed to be an outlet for the thoughts of our readers—a sort of silent policeman to whom you can tell your troubles. If you have a problem which is vexing you tell it to the editor of the open letter department. If you have a thought or suggestion which you think would prove of benefit to someone else or to the craft at large, send it on. In other words this department is yours and the editor wants you to use it in the way most helpful to yourselves. Ask the editor any reasonable question and he will rest not day or night till he gets you an answer for it.

* * *

The editor is in a position to sympathize with the old farmer who remarked that while the crops weren't near as big as he expected he wasn't very much disappointed because he didn't very much expect they would be.

Several months ago the editor opened this department with an article inviting the trade to contribute ideas on the subject of sanitary legislation and offering ten dollars for the best paper contributed, not with any idea that this modest sum would tempt any plumber but "just to help the fun along."

Evidently those who read that appeal felt as did the good parson who, when called to a church which paid very little more salary than he was getting for much harder work found that the call wasn't loud enough.

Now the logical conclusion would seem to be that the call ought to be made louder, but in the first place the editor doubts his ability to offer a prize which would tempt a plumber and in the second place this call for ideas was designed to reach only those who are sincerely interested in sanitary betterment and who write and speak of the subject because of their interest and because of their desire to help along the cause. To those of our readers who come under this head the editor again extends a most cordial invitation to express their views in the open letter department of DOMESTIC ENGINEERING.

WHY DO RATS GNAW PIPE?

To the Editor of DOMESTIC ENGINEERING. Dear Sir:—I have frequently seen the statement made by writers on sanitary science that lead pipe should never be used for water pipe for the reason that rats gnaw through it to get at the water inside. I have even seen the statement made that rats will gnaw supply pipes to get at the water. Now I have nothing to say against the statement that lead should not be used for waste pipes for there is no denying that rats do gnaw the pipe, but my contention is that they do not do so because hungry or thirsty but because the lead pipe happens to be in their way when trying to make or enlarge a hole.

In the first place the rat is a good deal more particular about his food than most people give him credit for being and in the case of kitchen waste at least a rat would let the contents of the waste pipe severely alone if for no other reason than the fact that it is strongly tinged with alkali from the soapy water.

As for the statement that a rat will tap a supply pipe in order to quench his thirst, I can only say that I have seen Mr. Rat at work and a more surprised rat you never saw than when he cut through the pipe and the water gushed out. He scurried away as though a dozen cats were after him.

In all my experience in the plumbing business (and I have been at it over thirty years), I have never seen a pipe gnawed except where it goes through floor or ceiling. This leads me to the conclusion that Mr. Rat never interferes with lead pipe except in the course of regular business of going wherever he pleases with those sharp little teeth of his.

As everyone knows who has ever observed the ways of Mr. Rat he always chooses for his gnawing an exposed edge of board and the place where a pipe goes through the floor is just such a place as he likes to begin on. And once started he gnaws indiscriminately and the result is a leaky pipe.

Well, Mr. Editor, I guess you'll think I am making a long story out of a little thing, but the point is just this. The architects and others who study sanitary engineering from a purely theoretical standpoint sometimes make themselves ridiculous in the eyes of the men who practice the art through their unguarded statements, and then we who carry the kit distrust everything they say because of the few mistakes they make. Perhaps it is asking too much of a sanitary engineer to lie on his stomach in the dark and work alongside of Mr. Rat for an hour at a time, but if he did he would learn a thing or two about some phases of the plumbing business which would make his writings much more practical and therefore much more valuable to the men who work.

ANSWER.

It is the old story of practical versus theoretical and we quite agree with the writer that most theoretical writers would do better to test their theories in actual practice before putting them on paper. The statement which the writer challenges is a very common one and we do not remember ever to have seen it challenged before. If the writer is correct in his supposition he has put many of the well known authorities in the wrong. It is, of course, of little importance whether the rat gnaws the pipe purposely or accidentally. The main thing is that he does gnaw it. But we admit the force of the writer's point that a few unimportant misstatements may cause the discrediting of the entire theory, and for that reason it behooves a writer to be very sure of his ground.

On the other hand the practical plumber should remember that much of the demand for better plumbing which is resulting in a greater popular appreciation of his craft has come as a result of the studies of architects and others who, realizing the importance of proper plumbing, have striven to elevate the standard of material and workmanship. Most theoretical writers willingly acknowledge their indebtedness to the practical men of the craft; the practical plumber certainly owes much to the theoretical writer and should be equally willing to admit his indebtedness. Both are working toward the same end—improved plumbing methods—and both should be willing to occupy the place of the learner.

HOT WATER AND STEAM PIPING.

To the Editor of DOMESTIC ENGINEERING. Sir: Is steam heating set in on the same principle as hot water heating? As I have had little experience in installing steam jobs you will oblige me very much by a little information on steam heating.

ANSWER.

While the piping systems for steam and hot water have many points of similarity they are in other particulars so essentially different that anything like an adequate description of their points of difference would be out of the question in this department. In a case of this kind the editor would recommend that his correspondent get some good work like Lawler's Hot Water Heating, Steam and Gas Fitting, and familiarize himself with the best practice in these lines. It will be time and money well spent. If some particular phase of the subject troubles him we would be very glad to give specific answers to specific questions and render such other service as lies in our power.

THE MINNEAPOLIS DIFFICULTY.

The following extracts from a letter received from a prominent member of the Minneapolis Association of Master Plumbers will serve to contradict the daily press report that the Association has gone out of existence and will also throw light on the conditions leading up to the present state of affairs.

The facts are that for the past four years the Minneapolis Master Plumbers' Association has been working for trade protection and also getting a fair price for their work. Messrs. Kelly & Wilkins were very prominent in association matters along that line of operation up to July last, Mr. Wilkins being chairman of the joint conference committee which drafted the articles of agreement with the journeymen plumbers to work for association members only. The journeymen as long as they were all employed were very loyal to the agreement; and upon being notified that Kelly & Wilkins were no longer members in good standing promptly withdrew their men. Mr. Wilkins was suspended for "conduct unbecoming a member."

Mr. Kelly then tried to bluff the association with his resignation but his resigna-

tion was accepted. Mr. W. W. Sykes likewise tendered his resignation (with no explanation) which was also accepted. He later made application for membership rather than fight the Journeymen's Union. Conference committees were appointed from both associations and met the parties interested, but were unable to reach a settlement because of the fact that K. & W. emphatically stated they would never go back, as long as the agreement with the journeymen was in effect.

They thereupon carried their trouble to the Building and Trades Council, and through the press stated that they would not be hampered by the association rules and only desired free and unlimited competition, etc., and so on. The result was that K. & W. secured considerable work through the notoriety thus gained. When work became slack the journeymen, in order to keep as many of their men at work as possible, voted at one of their meetings, to abrogate the agreement, and allowed its members to go back to K. & W. and work with their non-union men, which they have done. In wiping out the agreement the Master Plumbers' association lost its most effective means of disciplining its members for violations of association rules; and as K. & W. have expressed a desire for free and unlimited competition, a majority of the association members at their last meeting voted to conduct the plumbing business along those lines, (at the expense of empty pockets and unpaid bills), and to balance all accounts with its members, and to abolish the business end of the association, continuing it along social lines.

But the association will not disband as stated by the press, for the renegades to pick up later on and reorganize. There are too many loyal association members who would not turn traitor to their local association for the sake of a few hundred dollars and figure it as a sharp business transaction, nor try to gain business under the cloak of free and unlimited competition.

The action of the association in abolishing the business end of the association is simply in keeping with the conditions of the plumbing business, as it exists here at the present time. Henceforth it will be free and unlimited competition at the expense of empty pockets and unpaid bills.

Who is Right?

To the Editor of Domestic Engineering. Sir: In No. 2, vol. 21, of your magazine, in an article on heating and ventilation we read as follows, "Where steam is used, the radiators are always at practically the same temperature, and regulation must be secured by shutting off steam and turning it on at intervals depending on the outside temperature."

There are thousands of radiators used with hand air valves instead of automatic, where enough air is expelled to heat only a portion of the radiator in mild weather, and the balance remains cold during the day, and this allows the occupant of a room to have any desired amount of heat with less trouble than he would have with hot water.

In the same article under the head of exhaust steam, it says, "There are two methods of using exhaust steam for heating purposes. One is to carry a back pressure of from 5 to 10 pounds, depending on the length and size of the pipe mains."

Thirty years ago there were steam heating firms that heated buildings of several hundred feet in length with exhaust steam, and guaranteed to do it with a pressure not exceeding two pounds, and to prove it, used an inverted syphon to show the pressure, as no steam gauge was sensitive enough to show the exact pressure when it was less than one pound. To-day there are electric light plants that heat several business blocks in their vicinity with exhaust steam and never have a back pressure exceeding two pounds. In one case at least there is radiation enough to use all of the exhaust on the forenoons of cold days.

The author of this article must have been unfortunate in his experience if he has not learned such facts. Yours truly,

Steam Heat.

Answer.

The editorial department does not claim for itself or for any of the writers who contribute to the technical page of Domestic Engineering the attributes of omniscience or infallibility, and it is the privilege of every reader to criticize any statement which appears in these columns provided it does not tally with his experience. In fact the editor would be glad to see evidence that the technical pages are read so closely that every slip is noticed and commented on. Writers and public speakers do their best when they have a critical audience. In the case at hand we have referred Steam Heat's communication to the author of the article and await further developments with interest.

What Causes Condensation?

To the Editor of Domestic Engineering. Sir: Will you please explain in your Domestic Engineering journal what causes sweaty pipes and also the best way to stop it. I have a job here where I have tried everything except packing the pipes which the man doesn't want on account of the looks. Please answer in your next paper.

Answer.

The cause of so-called sweaty pipes is very simple and the remedy equally simple. Perhaps it is hardly necessary to explain that the pipes are not sweaty in the sense that the moisture comes through the pores from the inside, though this is a not uncommon belief among those who do not understand the cause. The moisture on the pipes is, of course, caused by the condensation of the moisture in the air, the difference in temperature between the air and the pipe causing the condensation of the natural resistance in the air and depositing it on the pipes. To go a step further, the difference in temperature between air and pipes is caused by the water flowing through the pipes. Water at rest in the pipes soon takes nearly the same temperature as the room. Even an occasional flow of water through the pipes will not cool them enough to make them sweat but even a slight constant dripping will cause the trouble. That being the case it is only necessary to make all faucets and cocks on supply and flush pipes tight in order to put a stop to the trouble. Packing the pipes will, of course, help matters but this is an expensive and unnecessary proceeding and makes the plumbing unsightly and cumbersome. Go over all the supply and flush pipes and see to it that the connections are tight and you will find the trouble disappears.

Some Reasons Why You Should Belong to an Association.

by F. P. Edson, Topeka, Kas.

Broach the subject of Association membership to any master plumber, who is not a member of the Association, and naturally the first question asked is, What good will it do? What benefits are to be derived from it? The answers to this are legion, and must appeal to any man of sound business judgment.

I am very sorry to admit that I have heard old members of the Association, men who have been through some hard fought battles, ask this same question. But this happens only when competition is the keenest and petty jealousies and local disagreements crop out on the surface.

I know there are members here now who remember the time when the representatives of the supply houses spent more time calling on the consumers than they did on the legitimate trade. Who can remember when the landlord bought his material as cheap, if not cheaper, than the plumber was able to purchase it for, and then dictated his own terms to the master plumber for erecting same.

There has been some good object lessons as to the benefits derived from a membership in the Association during the last few weeks. Take a case in point at Wichita, where a landlord was indebted to a member of this Association and had asked for bids on some additional work. You are all familiar with the bulletin issued by the Confederated Supply Association. Another case arose in the western part of the state, where an implement dealer was selling plumbing goods, and the jobbers cancelled his orders. All of which was the direct results of the workings of the Association.

To go further, and to quote from the president of our National Association: "Let us consider some other lines of business and note the comparisons. The shoe men are forced into competition with the department stores and clothing merchants. The crockery stores have their sales reduced by the dry goods stores during the holiday season. The large department stores can be found carrying a stock of almost every line with the exception of plumbing. All due to the existence of our Association."

You can buy groceries, hardware, confectionery, drugs, etc., in these large stores at a price which is prohibitive to the retail merchant. The carpenter, stone mason, plasterer and brick layer sits calmly by and watches the consumer buy material in his line as cheap as he can buy it, and is forced to look for journeymen's wages only for installing same, and how often the consumer haggles over the price of that.

The only reason that the plumbing business is an exception to this rule is from the fact that a few persons engaged in the business, formed this Association and fought the battles for all of you in the past, and I might say some of them were very pretty fights.

I hold that it is the duty of every Master Plumber to lend his moral and financial aid to the organization which has brought about these results.

There is not a Master Plumber doing business in the country to-day who does not owe, in a measure, what success he may have had, to the effort of this organization; without it you could not exist and do business. While it is true that local conditions at times, engender hard feelings; that competition is brisk and you cannot figure how some of your competitors keep up at the prices they take their work, I believe these maters will adjust themselves; but where would we be if we were forced into competition with the jobber and manufacturers.

The effect of organization has also been to improve our own knowledge of the business that brought about the popularizing of the business, and a discriminating knowledge of the best sanitary methods and the elimination of poor material and workmanship. The public is beginning to recognize the fact that it is of general good to all to improve sanitary conditions and thus prolong life. The prevention of disease is certainly a laudable pursuit, and the Master Plumbers of Kansas have been first and foremost in this direction.

Acetylene Gas Apparatus for Plumbers.

By W. A. Anderson, Ottowa, Kas.

"The rapid development of acetylene as a lighting agent, means a new line of work to our plumbers and gas fitters, particularly in small towns and in cities for districts beyond the reach of city gas, and as an auxiliary to electric light plants, where the demand for day and all night current is not sufficient to be profitably run.

"The success of acetylene gas for lighting is no longer a question, it has proven a success in every respect, where a good plant and a good job of piping has been installed.

"The first thing to be considered in house piping for acetylene, is to have ample pipe capacity for its distribution, as it only takes about one-tenth as much acetylene gas to supply a tip as it does city gas, smaller pipe may be used with just as good results, but do not understand that pipe one-tenth as large may be used for the following reasons: acetylene is about twice as heavy as city gas, therefore, is more sluggish in its movement, and with a small sized pipe the possibility of stoppage from scales, or the use of too much lead on threads must be considered.

"In any illuminating gas the essential thing is to get pipes large enough to carry the full pressure desired to each burner. As acetylene gas will under different changes of temperature condense to a certain extent, it is necessary to have the pipe grade back to the generator or a drip.

"Another thing to consider in acetylene gas piping, the job must be absolutely tight, the fittings must be free from sand holes, no split pipes, no defective joints, the use of galvanized fittings are recommended.

"If a job of piping and fixtures are put in by a man that knows how, there will be no leaks. If there is poor work, and it should leak, the odor will give instant warning, and as acetylene costs six times the money per cubic foot that city gas does, the consumer will at once claim that the light is costing too much money. Therefore a close consideration will convince you that this line of work must be controlled by a plumber or gas fitter.

"The simplicity of acetylene gas early brought forth quite a crop of inventions for its generation, and, as a result, many generators have proven faulty. The faults may be summed up as follows: too complicated carbide heating causing stoppage of burners, and not being proportioned so that the after generation can be stored for future use.

"In selecting a satisfactory generator, the principle points that should be carefully looked to, are a machine so constructed that the lights will not flicker, so proportioned as to avoid waste by blowing off, it should deliver cool gas perfectly washed, it must be automatic, it must be simple and durable, so that the use of a mechanic is not needed to operate it or preserve its continued usefulness.

"The principle of cool generation is imperative for best results, it must get out of the carbide all the gas it will produce. The pressure must not exceed thirty-tenths. It must have the approval of the Insurance Board of Underwriters.

"There are many other things to be considered which might be of interest to mention, it is wrong to choose a generator of such small capacity that it must be overdriven, this causes annoyance, inferior gas and bad results. Avoid all generators with small carbide capacity.

"The generator should be simple enough in construction to be offered at a price suited to the ordinary need, it should be compact enough to be admitted into an ordinary cellar.

"In selecting tips for acetylene gas, is also a matter of great importance, the tips must have sufficient air passage to avoid smoking, which causes the blackening of ceilings.

"There is no question but what every plumber and gas fitter should install acetylene gas generators, the field is large and there is room for all. Get the agency for a good reliable machine, and keep this growing business in the hands of the plumber, where it properly belongs."

Acetylene in Denmark.

The city council of Skjelskoer, Denmark, has given Mr. Nyboe and Mr. Nissen, two civil engineers, a fifteen years' franchise to establish and run acetylene gasworks in that city. Skjelskoer has a population of 2,500.

Carbide Easy to Get.

It will no doubt be of great interest to our readers to learn that residents and others may now obtain carbide for use in the Colt acetylene gas generators within the states of Illinois and Wisonsin without difficulty. These are the generators which received the highest award at the recent Pan-American Exposition at the hands of the Jury of Awards composed of the leading acetylene experts of the country.

The Leading English Acetyleneist.

King Edward of England, according to a foreign exchange, is patron of acetylene lighting. The installation is at Sandringham, and is giving the utmost satisfaction. The period during which acetylene has been used has been sufficient to afford a thorough test of its merits, and these have aroused nothing but enthusiastic commendations. As an English friend of acetylene says, "It is something for a young industry to have the greatest monarch of the world as a supporter."

New Lights for Trains.

The Oregon Short Line has begun to experiment with acetylene gas as a means for lighting cars. If the experiments are successful acetylene will displace Pintsch gas throughout the entire Oregon Short Line system. Experimental lights are being put in on the cars of Superintendents Young and Manson, and they will be given a thorough test. Acetylene is at present used for lighting the passenger cars on the Burlington, Santa Fe, Northern Pacific and Canadian Pacific. The new lights do away with the necessity of having gas plants like the one in Ogden, with carrying ponderous tanks under the cars, and with other expenses and inconveniences. Several railroads use acetylene for headlights.—Salt Lake City *Herald.*

How the Welsbach Mantle is Made.

The "mantle" of the Welsbach light is an ash consisting mainly of the oxides of certain rare metals—lanthanum, yttrium, zirconium, etc., which are rendered incandescent by heating to a high temperature. A six-cord cotton thread is woven on a knitting machine into a tube of knitted fabric of a rather open mesh. This web has the grease and dirt thoroughly washed out of it, is dried and is cut into lengths double that required for a single mantle. It is then saturated in a solution containing the requisite oxides, wrung out, stretched over a spool and dried. Next, the double-length pieces are cut into two, the top of each piece is doubled back and sewed with a platinum wire, which draws the top in and provides a means of supporting the mantle, when finished, from the wire holder. After stretching the mantle over a form, smoothing it down and fastening the platinum wire to the wire mantle holder, the mantle is burned out by touching a Bunsen burner to the top. The cotton burns off slowly, leaving a skeleton mantle of metallic oxides, which preserve the exact shape and detail of every cotton fiber. the soft oxides are then hardened in a Bunsen flame. A stronger mantle is made upon lace-making machinery.—The Keystone.

Vapor Lights in Cleveland a Success.

The Cleveland Plain Dealer of Oct. 19 says:

The Reserve Foundry and Mfg. Company of Cleveland, O., which has the vapor light contract for the city of Cleveland, now has about 2,400 lamps established. Its contract calls for 2,500 lamps.

Reports received at the city hall indicate that there has been a decided improvement in the character of the lamps and most of the vandals who have been interfering with them seem to be on a vacation.

"During the past week," said Director Salen, "I have been out nearly every night to make a personal examination of these lamps. Without any question they are the finest the city has ever had. Nearly all give a light that is far in excess of the candle power required by the contract.

"Out of 1,000 vapor lamps which I saw the other night only four were in bad condition and two were not in what could be called good condition. Not since we have had vapor lamps in Cleveland has such a showing been made. The light given by the vapor lamps is far superior to that given by the Welsbach gas lamps."

The company also makes many different styles of chandeliers and table lamps of highly ornamental design.

You can't afford to do without

WELSBACH

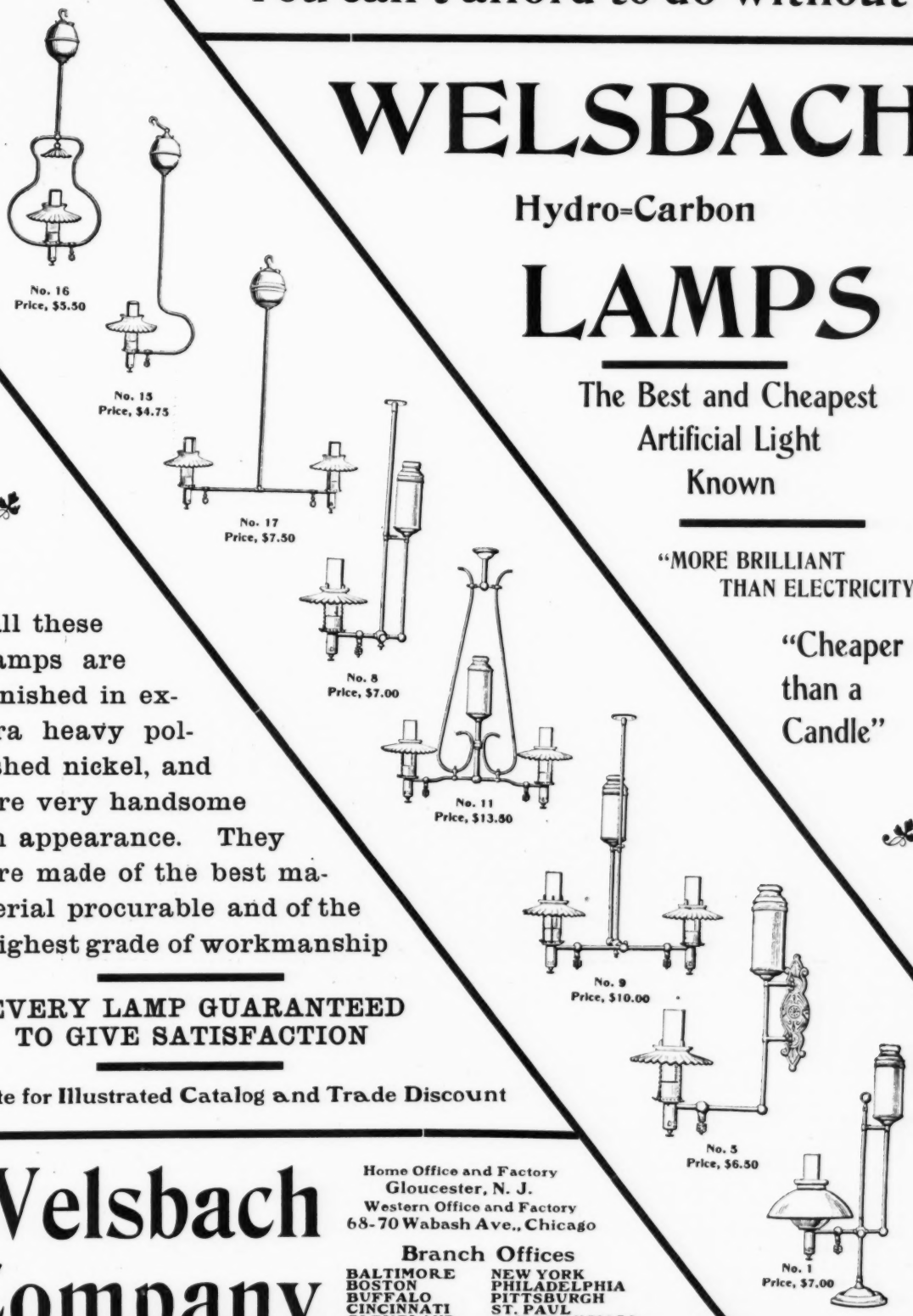
Hydro-Carbon

LAMPS

The Best and Cheapest Artificial Light Known

"MORE BRILLIANT THAN ELECTRICITY"

"Cheaper than a Candle"



All these lamps are finished in extra heavy polished nickel, and are very handsome in appearance. They are made of the best material procurable and of the highest grade of workmanship

EVERY LAMP GUARANTEED TO GIVE SATISFACTION

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PIPE COVERING TESTS.

A paper read November 12, 1901, by George H. Barrus, Expert and Consulting Steam Engineer, to mechanical engineers, architects and others, at the Manhattan Railway Power House, New York City.

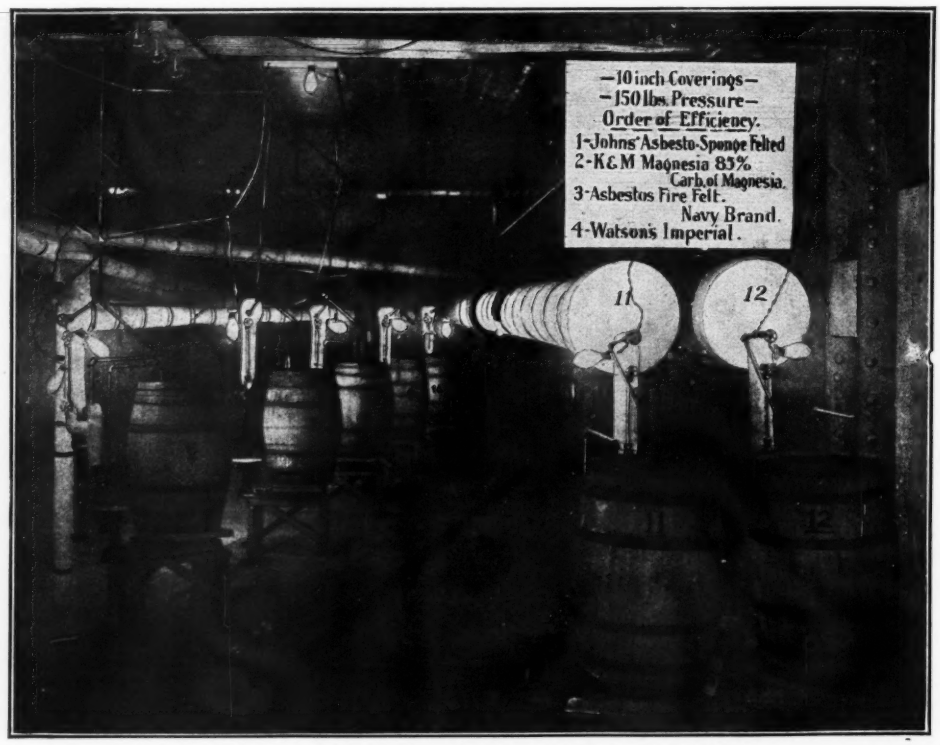
THESE pipe-covering tests were planned with the object of ascertaining the efficiency, both comparatively and absolutely, of some of the leading coverings as ordinarily manufactured, sold, and applied. I mean by the term "efficiency," simply that efficiency which measures the degree to which the covering serves to prevent radiation of heat from the outside of the pipe, or what is the same thing the degree to which the covering prevents the condensation of steam in the interior of the pipe.

That the work might also be carried out on a commercial scale it was sought to make and continue the tests a sufficient number of hours continuously in a day and a sufficient number of days in succession that no question could be raised as to the reliability of the data from too short duration, or from want of continuous repetition. Many of the coverings have therefore been tested day after day for a period of a month, and every one has been subjected to at least three days' run from 8 to 9 hours continuous test each day.

The size of pipe selected for the leading tests is the ordinary standard two-inch steam pipe; and the length selected, 100 feet, for each pipe. That the effect of size

the two ends of the room and thence after turning they are brought back to points near the center where the various collecting casks and weighing scales are conveniently located. Although the pipes in each section set out from the same point, or rather from points in line with each other above the header, they do not arrive at their destinations of discharge in a similar line with each other, because in making the turn and re-turn at the end of the room the outside pipes have the longer distance to cover. The 2-in. pipes are laid out 16 inches from center to center or 5 ft. 4 in. from the center of No. 1 to the center of No. 5. The same from the center of No. 6 to the center of No. 10. Con-

Apparatus at new Manhattan Railway Power House
75th St. and East River, New York,
For determining efficiency of Non-conducting Pipe Coverings.



Reproduced from Photograph of the
Drip Ends of the 150 lbs. section of 2 inch Pipes, showing Casks for collecting water; and Scales; also, the two 10 inch Pipes numbered 11 and 12.

To enable you in the best way to understand the whole matter, a few statements may be made regarding the general scheme of installation, the method of test and the leading results so far as yet worked out.

First, as to the arrangement of the testing plant.

The plant is divided into two sections, one for coverings designed to stand the highest pressures which are now regularly carried by the modern power plants, say 150 lbs. per sq. in.; and the other for lower pressures such as have been in vogue for many years past, say 80 lbs. per sq. in.

It was sought to install a testing plant for the purpose in view that should be on a sufficiently large scale to approximate to practical conditions of service, rather than make it a laboratory apparatus and a laboratory test which characterizes much of the work heretofore done in this field of testing.

of pipe on the results might be studied and exhibited, and at the same time the work brought into line with the practice of high pressure power plants, especially as regards much of the engine and boiler room piping, two 10-inch pipes each 35 feet in length form a part of the 150 lb. section of the apparatus.

The 2-inch pipe in the 80-lb. section of the plant are numbered for reference 1, 2, 3, 4, 5. The 2-inch pipes in the 150-lbs. section are designated 6, 7, 8, 9 and 10; and the 10-inch pipes are numbered 11 and 12.

To facilitate the handling of the apparatus and the ready collection and measurement of the water of condensation discharged from the pipes, the steam is first supplied to a central point on one of the long sides of a rectangular room, about 130 ft. long and 22 ft. wide, and the various pipes lead from this point outward to

sequently, the drip end of No. 5 pipe is 21 ft. 4 in. farther from the center line of the room than that of No. 1 pipe; and likewise the drip end of No. 10 pipe is 21 ft. 4 in. farther from the center line of the room than that of No. 6 pipe. The two 10-inch pipes are parallel to each other and a straight run. They are consequently arranged in a precisely similar manner throughout.

The main object so far as the getting of the principal data is concerned is to properly secure and measure the water formed by condensation of the steam in the pipes. Precautions must be taken first to insure a supply of steam to the pipes free from water at the start; in other words, dry steam; second, suitable inclination or pitch of the pipes to insure the drainage of all the water formed by condensation to the drip-ends or the points where venting is discharged into the collecting casks; third,

the thorough venting of the drip-ends of the pipes to prevent the collection of air in the interior, and fourth, the proper collection and measurement of all the water discharged. To secure dry steam at the start, the steam from the boiler first enters the central separator, which is merely a vertical 6-inch pipe, drained at the bottom by a steam trap, the steam entering through a 2-inch pipe at the top which descends about 18 inches; the steam, freed of its water, passing off at the two side branches which are each of the 2-inch size. Before entering either header the steam passes through another separator, which is likewise a 6-inch vertical pipe, drained at the bottom by a 3-4-inch valve, the entering steam likewise descending through a 2-in. pipe a distance of about 18 inches, and the dried steam passing off at the side into the end of the 6-inch header. As a further precaution the outer or dead end of either header is drained by a ¾-inch pipe, connecting into the main drain pipe above the valve, and attached to the vertical portion of this pipe is glass gauge to reveal to the eye any collection of water inside. Beyond all this, a steam calorimeter is attached to the side of either header the sampling pipe of which draws from the center of the interior space. Starting with dry steam in the headers which are protected by hair felt and canvas, a supply of dry steam to the pipes is secured by connecting to the top of the header and taking the steam in each case through a 2-inch angle valve. The proper drainage of the water formed by condensation in the test pipes is secured by pitching them from the inlet end to the discharge end. The 2-inch pipes have a total drop from one end to the other of 16 inches. The 10-inch pipes have a total drop of 6 inches.

The venting of air is secured by the attachment of a ¼-inch air pipe to each drip-end, at a point about ½-inch above the line of the bottom of the pipe inside.

The drip end of each test-pipe is provided with a vertical drain pipe of the ½-inch size, provided at the bottom with a ½-inch globe valve. Attached to the pipe above this valve is a glass water gauge. By means of this glass gauge which is an all-important appendage to each pipe, a knowledge is had of the exact state of the water condensed in the pipe, and by suitable regulation of the discharge valve the water can be kept drawn down continuously to the desired mark, and all the water discharged to the weighing cask as fast as it collects. To facilitate the easy regulation of the discharge water, a second discharge pipe of the ⅛-inch size is attached to the drip end of the lower gauge fitting and this is provided with a ⅛-inch globe valve. The main dependence for the discharge of water into the casks is placed upon this pipe, and its outlet descends to within 6 inches of the bottom. That all the water discharged under the pressure to which it is subjected in the test-pipe may be recovered without loss of evaporation when the pressure is relieved, the cask is partly filled with cold water at the beginning of a test, and the highly heated water is quickly cooled. Each cask rests on an independent platform scale which reads to ¼ lbs. and the rate of condensation in the pipe for any interval of time, such as a half hour, or an hour, is the increase of weight shown on the scales for that period of time.

It will be observed that a considerable blow of steam occurs from the vent pipes. This is *steam* in every case and not the water of condensation from the test pipe and it insures the complete "ventilation" so to speak of the interior.

So much for the leading features of the plant. Taking up next the coverings themselves; these, I would say first, were bought in open market, and I believe them to be what they were by this method of purchase intended to be samples of the coverings which are ordinarily supplied by the various manufacturers in the ordinary course of business.

They were applied by workmen familiar with the application of pipe coverings, under intelligent supervision, and in my opinion well butted, joined and secured. During the progress of the tests they have been frequently pointed up with cement where the joints through continued service have become defective, the same as would be done by the repair force having the care of a steam plant in commercial service which is well kept up. Before the conclusion of the tests opportunity was given the representatives of each covering to visit the plant, examine his goods, criticise their application and where defective, correct the defects. It may be said, here, that where such defects have been found and corrected no appreciable improvement was produced, thus showing that the coverings were already well applied.

In planning the tests of the 80 lb. section of coverings two methods have been pursued. The four pipes No. 2, 3, 4 and 5 have been tested with four different coverings, each of which has been in use without removal during the entire time of the tests, which commenced Sept. 27th. With the exception of one week, these coverings have been under test 8 to 9 hours per day, each day of the week throughout. On the contrary, No. 1 pipe has been used for testing the same class of coverings, and one or two in addition, for shorter periods. First, the same class of covering as that on No. 5 pipe has ben applied to No. 1 pipe and tested about a week. Then the same class of covering as that on No. 4 has been

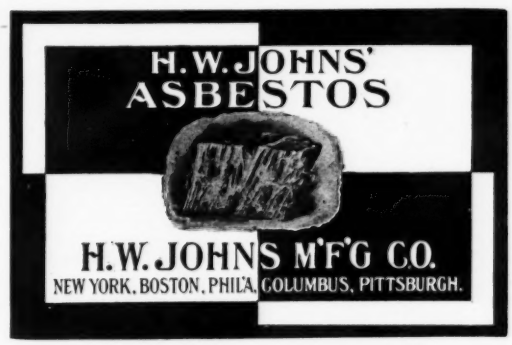
H. W. JOHNS' ASBESTOS

Non-Heat-Conducting Coverings

Developed the Greatest Coal-Saving Powers

IN COMPARATIVE TEST AT NEW POWER HOUSE OF THE MANHATTAN RAILWAY CO., NEW YORK, IN NOVEMBER, 1901, CONDUCTED BY MR. GEORGE H. BARRUS, EXPERT AND CONSULTING STEAM ENGINEER.

SEE PAGE 184 OF THIS PAPER FOR REPORT OF THIS TEST.



IF IN NEED OF COVERINGS, STATE WHAT STEAM PRESSURE YOU ARE CARRYING AND WE WILL BE PLEASED TO SEND SAMPLE OF MOST ECONOMICAL MATERIAL WITH PRICES. OUR LONG EXPERIENCE MEANS PROFIT TO THOSE WHO BECOME OUR CUSTOMERS.

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substituted and tested the second week; then the same as No. 3 the third week, and so on; thereby applying one by one the various coverings to the same pipe, and so far as attainable subjecting it to the same surrounding conditions. To a limited extent the same system has been followed on the 150 lbs. section of 2-inch pipes; the endeavor being to obtain sufficient data to enable a reliable conclusion to be drawn regarding the effect of all differences of condition.

The tests have started each morning with pipes empty and pipes and coverings cold. A period of 1½ hours has usually sufficed to thoroughly heat the coverings, and after that time for 7 to 7½ hours uniform conditions as to rate of condensation have prevailed. At the end of the day's run, the steam has been shut off from the headers, the pressure allowed to fall, and just before the pressure reaches zero the ⅛-inch drips are blown out and the water remaining in the pipes drained into pails through the ½-inch valves; the pails being subsequently emptied into the casks. All the water resulting from the preliminary heating of the pipes and coverings and the draining of the apparatus at the end, is collected and weighed in the casks, in addition to that condensed during the period of normal conditions. Half-hourly observations are made of the weight on each scale, so that the condensation due to the preliminary heating can be separately determined, and the record of the test ascertained for any smaller period desired than the whole day's run.

The temperature of the air surrounding the pipes is shown by thermometers in japanned cases which are suspended 24 inches below the coverings, and distributed in various parts of the room; and the condition of the air as regards humidity is shown by wet and dry bulb thermometers.

The pressure in each of the two sections of the apparatus is shown by the gauges attached near each header, and the temperature of the steam by two thermometers placed in wells which are sunk within. The temperature of the water discharged from the pipes is shown by thermometers in No. 1 and 6 discharge pipes. The temperature of the outside surface of the coverings has been found by laying the bulb of a thermometer alongside the covering and protecting it from outside influence by a thick layer of hair felt tied on. Pans of water well protected by hair felt have also been used, encircling the upper half of the pipe, and their temperature taken.

All the various instruments referred to have been observed during the test at uniform time intervals, so as to obtain average records of the attending conditions; and if you will examine the apparatus you will see their various locations.

The presence or absence of air currents about the pipes has been frequently tested by using a delicate anemometer, pointed in various directions; but as a result of these observations no current has at any time been found of sufficient force to move the fan in the least.

These tests have, as a rule, been made with pipe having dead ends and with no circulation of steam through the pipe except that required to supply the loss by condensation, and the small amount escaping at the air-vent—in no case being in excess one-half of one horse power of steam for any one of either the 2-inch or of the 10-inch pipes. To determine whether this method of test is applicable to the ordinary conditions of service where steam is moving through the pipe at a far greater velocity, pipes No. 1 and 6 were fitted at their drip ends with steam disharge pipes arranged as can be seen by inspection, so as to obtain any desired current through the pipe without carrying away with the steam discharged any of the water condensed. The amount discharged was determined by passing the steam through a horizontal orifice ½-inch in diameter, and maintaining above it a pressure of about 15 lbs. by the gauge. This makes a current through pipe No. 1 having a velocity of about 18 feet per second. It was found as a result of tests made first with no current and then with the steam moving at the velocity mentioned, that the rate of condensation was unaffected, being the same with moving steam as it was with comparatively dead steam, and this was true whether the pipes were covered or bare.

I have not been able to work out the results of the tests fully as yet—indeed they are not quite completed,—but would say that the coverings tested the relative efficiencies as thus far determined are indicated on the placards which I have hung up before you.

The lowest rate of condensation obtained on any of the 2-inch coverings of the 80 lb. section has been a total for the entire pipe of 13.46 lbs. per hour, and the highest, 15.14 lbs. The lowest on any of the 2-inch coverings of the 150 lb. section has been 10.47 lbs. per hour and the highest 14.00 lbs. per hour. The lowest on any of the 10-inch coverings is 10.67 lbs. per hour total for the entire pipe and the highest, 15.93 lbs. All these figures apply to the average rate for a period of 7 or 7½ hours continuous run. The minimum and maximum rates of each of these coverings are given in the appended table, together with the condensation in the bare pipes.

The characteristics of the various coverings may be seen by an examination of the various samples attached to the different pipes.

ORDER OF EFFICIENCY.

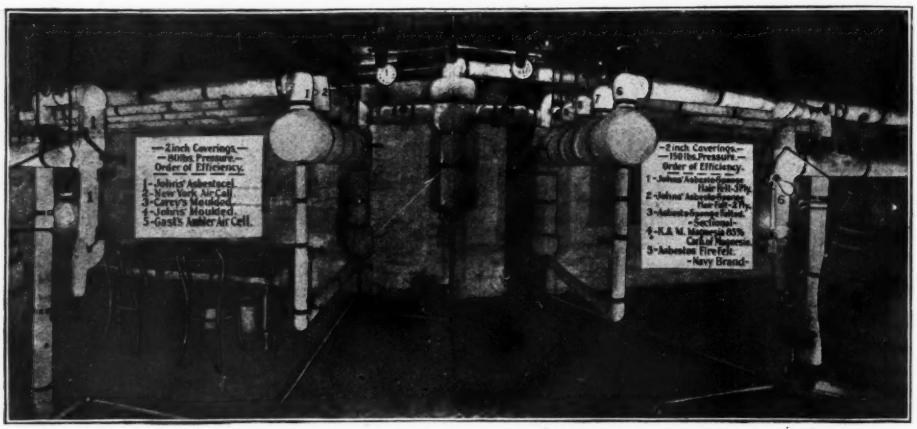
2-INCH COVERINGS—80 LBS. PRESSURE.

1. Johns' Asbestocel.
2. New York Air Cell.
3. Carey's Moulded.
4. Johns' Moulded.
5. Gast's Ambler Air Cell.

2-INCH COVERINGS—150 LBS. PRESSURE.

1. Johns' Asbesto-Sponge Hair Felt—3 Ply.
2. Johns' Asbesto-Sponge Hair Felt—2 ply.
3. Asbesto-Sponge Felted (Sectional.)
4. K. & M. Magnesia (85 per cent Carb. of Magnesia.)
5. Asbestos Fire Felt (Navy Brand.)

Apparatus at new Manhattan Railway Power House
75th St. and East River, New York,
For determining efficiency of Non-conducting Pipe Coverings.



Reproduced from Photographs
taken at the center of the apparatus
showing Headers and Ends of the Test Pipes where the steam is supplied.

10-INCH COVERINGS—150 LBS. PRESSURE.

1. John's Asbesto-Sponge Felted.
2. K. & M. Magnesia (85 per cent Carb. of Magnesia.)
3. Asbestos Fire Felt (Navy Brand.)
4. Watson's Imperial.

HEALTH AUCTIONED OFF TO LOWEST BIDDER.

As great care should be exercised in selecting a plumber as is shown in selecting a physician, for no physician can counteract the evil effects of the defective plumbing. When this is generally understood the element of competition will be largely removed. What householder would think of "dickering" with his doctor about the charge for attendance upon any sick member of his family? Yet we find the same householder auctioneering off the health of his family to the lowest bidder. This Association can do much to improve this condition by doing good work and furnishing first-class material and letting the curb stone plumber do the "sewer gas act," until in time the public will find out the deficiencies.—A. P. Elder.

THE OTIS FEED WATER HEATER.

We illustrate the Otis Feed Water Heater and purifier which is manufactured by the Stewart Heater Co., Buffalo, N. Y., under the following guarantees:

First. We guarantee that our heaters can be more easily and thoroughly cleaned than any other tubular heater in the market, and that they will retain their heating qualities when other heaters have become useless.

Second. To heat the feed water to the boiling point, 210 degrees or 212 degrees Fahr., with the exhaust steam without causing any back pressure when our standard heater is used.

Third. That all the impurities in the feed water that will precipitate at that temperature will be deposited in the Heater before the water enters the boiler.

Fourth. That this Heater will not get foul with scale.

Fifth. That it will separate and carry off the water of condensation from the exhaust.

Sixth. That it will extract the oil from the exhaust so that the exhaust steam can be used for heating purposes, and the condensation from the heating coils be returned to the boiler without injury to them.

Seventh. That it will collect and carry off the scum from the surface of the water.

Eighth. That each tube can expand and contract independent of the others.

Ninth. That it can be quickly and thoroughly cleaned in a few minutes.

Tenth. That it is made of the best materials and is thoroughly tested before leaving the factory.

Eleventh. That it reduces back pressure.

Twelfth. That by using one of our Heaters and a Feed Pump, a saving of from 15 to 25 per cent will be effected over an injector.

Upon application, mentioning DOMESTIC ENGINEERING, a circular will be sent illustrating the heater more fully.

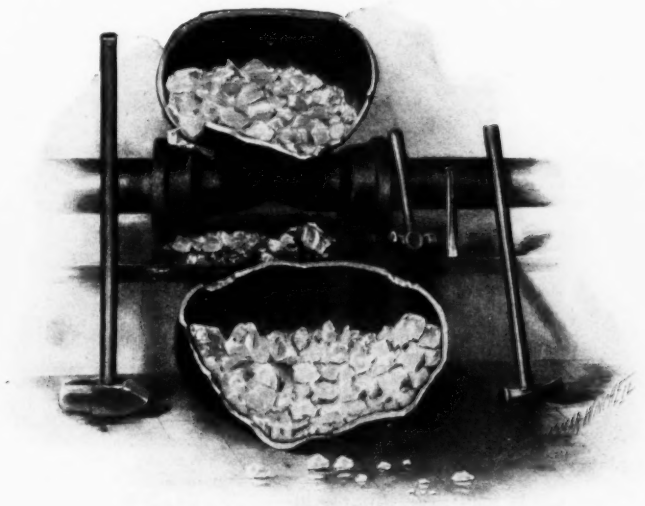
IDEAL VOLUMETER NOT AN INFRINGEMENT.

Readers of this paper may remember having seen a notice, published in December 1900, that the Kenney Company of New York had commenced suit against The Ideal Manufacturing Company, of Detroit, to restrain an alleged infringement of The Kenney Company's patents. The claim was that the Ideal "Volumeter" was an infringement of the patents covering the Flushometer, a flushing valve.

After the testimony was taken in the case, The Kenney Company consented to a decree dismissing its bill, without a hearing in court, conceding that on the proofs the Volumeter was not an infringement of its patents. The testimony conclusively showed the Ideal Volumeter was in structure and operation entirely different from The Kenney Company's flushing valve—in fact, of a different type or class.

THE PNEUMATIC DOME.

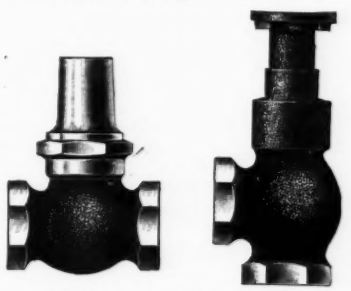
The Anti-Bursting Pipe Company, of Pittsburg, Pa., manufacture several devices to prevent the bursting of house and sewer pipes through freezing. The cut which we show herewith illustrates one of their pneumatic domes, broken open with a chisel after freezing. The view shows how the increased bulk of the frozen water has been safely stored during the freezing process. The pipe to which the dome was attached, although plugged at both ends, was in perfect condition after the thaw. Their system of pipe protection depends upon the well-known tendency of freezing water to flow like a viscous body, and upon the elastic character of cushions of air. They claim that this system of pipe protection delays freezing, prevents bursting, eliminates all annoyance from water hammer and purifies the water by aeration. The inventor of the system was awarded by the city of Philadelphia the John Scott medal on the recommendation of the Franklin Institute. DOMESTIC ENGINEERING readers who write to the Anti-Bursting Pipe Company, Pittsburg, mentioning this journal, will receive a handsome illustrated booklet further describing this system.



LeValley, McLeod & Co., Elmira, N. Y., have some work in Niagara Falls, in which they are using Cooper's closets.—Adv.

GAS BRASS GOODS.

The J. B. Campbell Brass Works, Erie, Pa., make a complete line of brass and iron goods for water and gas connections. The two illustrations we show herewith are a lock shield valve for gas and a lock shield



floor valve for gas. Their handsome catalogue, which will be sent upon application, if you mention DOMESTIC ENGINEERING, contains 224 pages of interesting matter and it is one of the handsomest brass goods catalogues issued in the country.

Byron Parker, Hudson, N. Y., has some alteration work on hand in which he is using Cooper's Nautilus closet.—Adv.

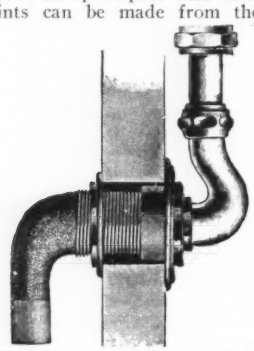
ATLAS TUBE CLEANERS.

The Atlas Pipe Wrench Co., manufacturers of The Atlas Pipe Wrench, beg to announce to the engineering profession that they are now ready to deliver Atlas Tube Cleaners of the No. 4 size—for water tube boilers with No. 4 tubes.

Grant Jenkins & Co., Philadelphia, are plumbing an Arch street residence, using Cooper's goods.—Adv.

A New Urinal Connection.

Street & Kent, Chicago, Ill., manufacturers of plumbers' brass work, are putting on the market the "S. & K." improved adjustable inlet and outlet conection for syphon jet urinals. This connection does not require an open space back of the stall. All joints can be made from the front.



The urinal can be easily replaced as the construction of the adjustable arrangement of the inlet is such that adjustment both vertical and horizontal is possible. A special feature of the inlet is that it has a full inch water way, giving a large flush. They are making a special price on these to the trade and will welcome correspondence mentioning Domestic Engineering.

The Kenney Flushometer.

This illustration shows the application of the flushometer, a device for flushing water closets by which one or any number of closets under various conditions of water pressure can be operated. It does away entirely

with overhead tanks and contains no top levers or springs. Catalogue and list of recent installations will be sent if you write to the Kenney Co., 72-74 Trinity Place, New York City, mentioning Domestic Engineering.

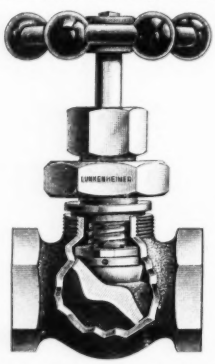
The John Davis Company Catalogue.

Steam Catalogue "G" for 1901 is being sent to the trade by the John Davis Company, 51 to 79 Michigan street, Chicago. It contains some five hundred and fifty pages of good things in the line of steam, gas and water iron and brass goods, plumbers' and steam fitters' tools, etc. Water works and fire department equipment also find an important place in the catalogue, the title on the cover of which hardly describes the contents. In the back of the book are a few pages of information useful to workers in water and steam and a carefully arranged index. The catalogue is of handy size and conveniently arranged for ready reference.

Many who are not acquainted with the extensive lines manufactured and handled by the company will be surprised at the showing made in this up-to-date catalogue. The Davis works are somewhat outside of the district most familiar to supply men and few realize the immense business being done by the company in a quiet way. But a visit to the busy works of the company would soon convince any one of the fact that the John Davis Company is getting its full share of orders in all lines.

The Lunkenheimer Valve.

The Lunkenheimer regrinding valve is made of gun metal and is called for when thoroughly reliable service is desired. It is made with screw or flange ends for 200 and 230 working pounds pressure in sizes



from 1-8 inch up. The valves are extensively used in continued service on war vessels of the United States Navy, on locomotives, lake and river boats, power plants, etc. If you write for Lunkenheimer catalogue of brass and iron engineering appliances of superior quality, kindly address the Lunkenheimer Co., Cincinnati, O., mentioning Domestic Engineering.

The Indestructible Nipple Holder.

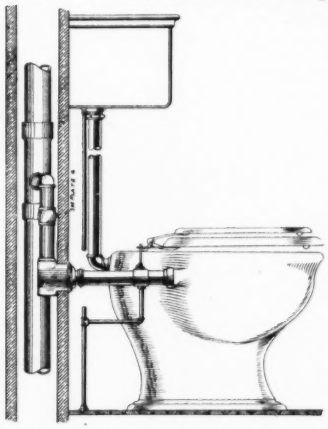
The Indestructible nipple holder, made by A. & W. Cuthbertson, Holyoke, Mass., is described by the makers as made of Jupiter cast steel having a tensile strength of 70,000 pounds to the square inch. It is extremely simple, has no interchangeable parts to lose, each size being complete in itself Thus all can be in use at the same time, which is a distinct advantage. The Indestructible cuts right and left hand nips and is something that all progressive plumbers, who wish to save time and annoyance should have.

The operation is simple: Put the holder in the vice; screw in the nip with the fingers; then, by striking a tapered cutter the nip is securely held till the thread is cut, when it is released by striking the small end of cutter. It is made in sets of six sizes from ¼ inch to 1¼ inch, and sold singly if desired. g

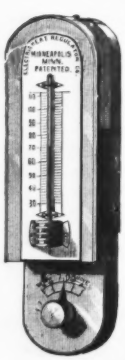
For further particulars and descriptive matter address, mentioning Domestic Engineering, the makers, A. & W. Cuthertson, Holyoke, Mass.

An Entirely New Device.

The "Puritus" closet local vent connection is an entirely new sanitary device which is being placed on the market by W. J. Scully Ventilator Co., of Detroit, Mich. It is attachable to any closet whether with or without local vent and it makes the bath room always odorless and keeps the air in a healthful condition. The illustration we show herewith is only one of its various forms of application. Others are shown in their catalogue and price list which will be sent upon application, mentioning Domestic Engineering. The efficiency and usefulness of this local vent connection is testified by such reliable peo-



ple as P. H. Bryce, M. D., Provincial Health Inspector of Ontario, by E. A. Marsh, Superintendent of Ideal Mfg. Co., Detroit, and inventor of the Marsh steam pump and Ideal volumeter, and by Malcomson & Higginbotham, of Detroit, whose standing as architects is well known. Plumbers should get hold of this article and push it.



For Twenty Years

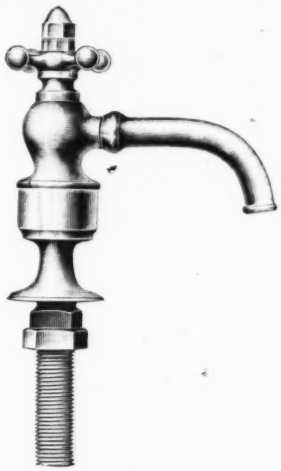
The "MINNEAPOLIS" Heat Regulator has been PROFITABLE to DEALER and CONSUMER. Suitable for Hot Water, Hot Air, Steam or Combination Heat. Installed at any time. Thermostat changed from one Temperature point to another INSTANTLY WITHOUT GOING TO BASEMENT. Satisfaction guaranteed. Sold subject to approval. Price and booklet upon application.

Electric Heat Regulator Company

First Avenue and Q Street, Minneapolis.

From Syracuse.

The newest things on the market that are destined to make a hit in the plumbing trade come from Syracuse. The Syracuse Faucet & Valve company are now making a line of faucets, bibbs, ball cocks, and valves that are absolutely free from packing of any sort, non-leakable and work noiselessly, without pounding. As there is no packing to wear, corrode or burn out with the action of water, steam or oil the jobbers say they are destined to have a large sale. The seats are entirely of metal and are easily and quickly opened or closed. Two seats revolve on each other and when the holes in them are opposite the water flows freely while a slight turn shuts it completely off. No water can get to the stem which passes through a separate chamber and no pressure is brought to bear by the operator on the seat.



The longer they wear the tighter they become and it looks as if the faucet that usually leaks at the top is a thing of the past with this late innovation at hand. This no-packing brand also extends to several other articles they are placing on the market, such as ball cocks, bibbs, valves, etc., and will be utilized by this company in bringing many useful inventions on the market.

Reliable Lead Goods.

The Raymond Lead Co., Chicago, makes a reliable line of lead goods for plumbers including lead pipe, sheet lead, lead traps, ferrules, bends, etc. Constant study and attention to the needs of the trade have given them an idea of what is wanted and they are prepared with their large facilities to furnish it.

Did you get one of those Little Books?

The Sanitary Specialty Mfg. Co., 55-57 N. Clinton street, Chicago, Ill., are very generous advertisers to the retail trade and will be glad to put you on their list for the advertising novelties which they are constantly getting out if you will write them, mentioning Domestic Engineering. This way you will get a large number of useful and ornamental devices without cost.

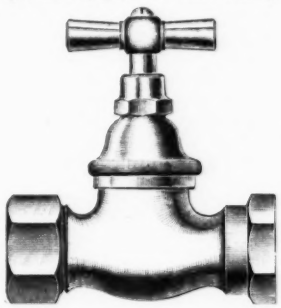
Paragon Steam and Hot Water Boilers.

Isaac A. Sheppard & Co., of Philadelphia, state to the retail trade that hey will make it pay retailers to handle Paragon steam and hot water boilers. Now this is a positive assertion made by a reputable house who are able to back up any statement which they may make. They are not philanthropists but recognize that it pays them to make it profitable to retailers to handle their goods. Write and ask them how they do it. In writing kindly mention Domestic Engineering.

Campbell Compression Work.

The J. B. Campbell Brass Works, of Erie, Pa., are turning out a line of compression goods of the same style as their noiseless bibb, the latest addition to which is the compression stop for closet supply here illustrated.

Their compression cocks are put up for iron pipe, lead pipe, lead and iron pipe or



slip joint, with wheel or bar handle with or without stuffing box, or may be arranged for lock shield and key.

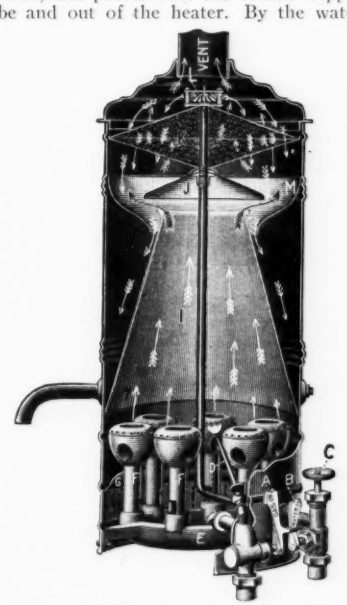
They carry an extensive line of water, gas, and plumbers' goods, and will cheerfully furnish a handy catalogue illustrating same on application, mentioning Domestic Engineering.

Get This Agency.

The Search Light Mfg. Co., 180 Division street, Chicago, Ill., are looking for good agents to handle their searchlight vapor lamps. Their catalogue and terms of agency will be sent upon application, mentioning Domestic Engineering.

Humphrey Heaters.

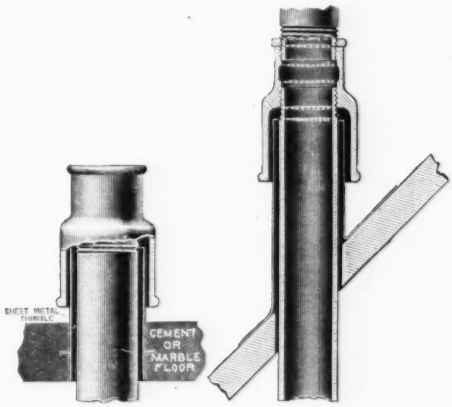
The Humphrey Mfg. & Plating Co., Kalamazoo, Mich., manufacture the Humphrey crescent instantaneous water heaters. We show a sectional view of the construction of No. 8 and a study of this will show why the heater is powerful. The water passes through the center pipe to the revolving distributor where it is showered onto the perforated discs in a thin film where it falls through the perforations, as shown by the arrows, and passes over the conical copper tube and out of the heater. By the water



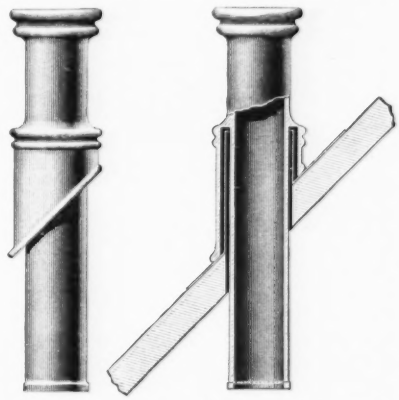
being subdivided into a thousand particles in passing through the perforations it becomes heat to a most remarkable degree. Upon application, mentioning Domestic Engineering, prices of this and other forms of the crescent heaters will be sent.

A Novel Roof Connection.

The Vanderman Plumbing & Heating Co., of Willimantic, Conn., have applied for patents on and will soon place on the market a novel floor and roof connection designed to make a perfectly tight joint pipe passing through the floor or roof, while at



the same time allowing for the expansion and contraction of the pipe. The four accompanying illustrations tell the story very simply. Figures 1 and 2 show the Vanderman Hood Coupling. By its use floors can be washed freely with the hose without looking where the pipe passes through the floor. It is independent of the metal roof flashing or the metal floor thimble, thus



overcoming the difficulty of making a tight joint. Figures 3 and 4 show Vanderman's improved roof vent pipe connection, a modification of the same idea. In this connection the pipe passes through the roof, a neat hood showing on the outside. These couplings are reasonable in price and the discounts quoted liberal. For further information address the Vanderman Plumbing and Heating Co., Willimantic, Conn.

Jas. McManus, Great Barrington, Mass., has a contract on hand in which he is using Cooper's closets.—Adv.

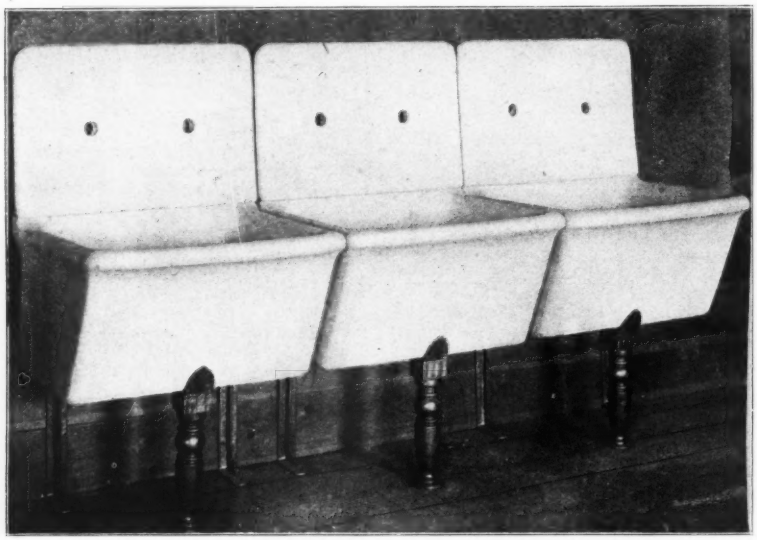
Pipe Straps.

Berger Bros. Co., 231-237 Arch street, Philadelphia, Pa., make a specialty of pipe straps. They are made in wrought iron, wrought iron ornamental and malleable iron ornamental. They can be had in sizes of ¼, ⅜ ½, ¾, 1¼, 1½ and 2 inches. They are neat, clean cut, uniform in shape, size and thickness and well tinned. Upon application, to the company mentioning Domestic Engineering, their complete catalogue showing pipe hooks, straps, and other useful devices will be sent.

T. H. Knight, New York City, is plumbing Grace Church in that city, using some of Cooper's goods.—Adv.

Perfection Solid Porcelain Laundry Tubs.

We illustrate herewith the Perfection, all pure white solid laundry tub, made by the American Porcelain Co., of New Brighton, Pa. These tubs are made of hard burned solid porcelain, the roll rim extending around both ends and the front, the back being plain to allow the rise of the solid porcelain backs as shown in the illustration. The length of the tub (front and back outside is 29 inches. The width of the tub (front to back outside) 26 inches. The depth inside is 15 inches. The backs are made with a flange on the lower edge, thereby preventing the water from splashing or running down behind. With each set of two or more tubs, one tub is



finished with a Perfection porcelain washboard. If more than one washboard tub is wanted, it will be furnished at an advance of $1.00 net over list price of plain tub. For further particulars and price list address the American Porcelain Co., New Brighton, Pa., mentioning Domestic Engineering.

W. J. Saylor, Jr., Schuylkill Haven, Pa., is plumbing a residence in that city, using Cooper's closets, baths, and other plumbing fixtures.—Adv.

Are You Galvanized?

L. O. Koven & Brother do galvanizing for the trade. Mr. L. O. Koven recently stated to a representative of Domestic Engineering that his firm does a great deal of galvanizing for people engaged in the following lines of trade: Plumbers' supplies, iron foundries, ornamental iron works, boiler makers, tank builders, ship smiths, marine engineers, and also for other lines.

The Koven Galvanizing Works are up-to-date in every particular and the plant is especially well equipped for doing extra large work such as cannot be done by other people in the galvanizing line. As L. O. Koven & Brother have a large store at No. 50 Cliff street, New York City, they are very handily located for the local trade.

Doing Buiness at Old Stand.

The Hays Manufacturing Co., of Erie, Pa., have rebuilt their plant above the ruins of the old plant, destroyed by an explosion November 9, and are now better equipped than ever for business. Their brass foundry is said to be as nearly perfect as modern methods can make it. The company is again vigorously after business with a good prospect of getting their full share.

They Are Satisfied.

There is nothing so pleasant to contemplate as satisfaction. It is the keynote whence emanates confidence in ourselves and others. Were it not for confidence and satisfaction the wheels of progress would cease and the commercial activity of the world retrograde. Domestic Engineering is satisfied with the great progress made this year and welcomes the coming year with assurance born of confidence that our efforts in the past have not been misdirected. And with renewed zeal, backed by the confidence manifested in us by thousands of our readers and advertisers we shall even eclipse the brilliant features that have marked the steady advance of our several editions the past year. We sincerely thank those who have applauded our efforts in the past and reiterate that no firm with good goods need hesitate a moment about using the advertising columns of any or all editions of Domestic Engineering. Your advertisement will appear with several hundred of the best firms in the lines in the world and if any other proof is needed we stand ready to show you letters commending the drawing power of these journals from scores of the leading firms in this country that know whereof they speak. We go to the buyers of goods in these lines as directly and forcibly, from the standpoint of printer's ink, as the newly found projectile speeds on its death dealing journey from the mouth of the great Gathmann gun. The following excerpt from a letter received December 5, is self-explanatory and only one of dozens we are continually receiving and occassionally printing:

"We thank you very much for past favors, and we are satisfied that by advertising in your paper we have received many new orders. Thanking you again we beg to remain, yours very truly,

The Beaton & Corbin Mfg. Co.,
A. R. Wells, Sec'y,
Southington, Conn.

Stinson, Kennedy & Co., Pittsburg, have some work on hand in which Cooper's goods are being used.—Adv.

To Make Galvanized Sheets.

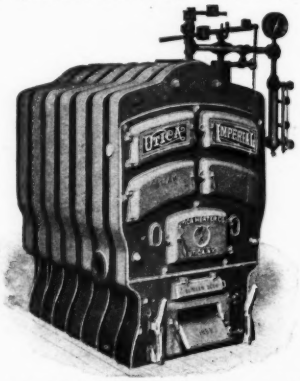
The Youngstown Iron Sheet and Tube Co., of Youngstown, O., announces that having purchased the plant of the New Process Galvanizing Co., they are now in the market to supply for early shipment double coated galvanized sheets, spelter over a foundation of lead. This, they claim, gives a sheet which will stand seaming, heat and exposure to a remarkable degree.

The Crosby Valves.

In the Crosby spring seat globe and angle valves all the parts are interchangeable and renewable. They are tested for the very highest pressure and have been made for 25 years. Upon application to the Crosby Steam Gage & Valve Co., Boston, Mass., catalogue will be sent if you mention Domestic Engineering.

The Imperial Heater.

The Utica Heater Co., Utica, N. Y., makes this "Imperial" steam and hot water heater. It is convenient to install and easily operated, economical in fuel and con-



tains new and desirable features never before employed. They also make round steam and hot water boilers and will be glad to send catalogue of their complete line upon application, mentioning Domestic Engineering.

Excelsior Waste and Basin.

The Sanitary Co., Cleveland, O., makes this Excelsior waste and basin which they put forward as a perfectly sanitary combination. The waste cannot get out of order and can be cleaned without removing. Their new catalogue "D" tells all about this and they will send it upon application, mentioning Domestic Engineering.

T. Lyman Howe & Co., Winthrop Highland, Mass., have the contract for plumbing a residence in that city, using Cooper's Nautilus closets, lavatories, baths, etc.—Adv.

A Special Price on Lavatories.

The Union Manufacturing & Supply Co., 317-319 Second avenue, Pittsburg, Pa., have purchased at a very low price the entire remaining stock of cast iron, porcelain enameled lavatories from an enameling estab-

lishment. These goods are of patterns in ordinary use, and are perfect in quality, and so long as they last are offered to the trade at unusually low prices; it will pay you to write to the company, mentioning Domestic Engineering, asking prices on this lot of goods.

Will Exhibit at Charleston.

G. & A. Bargamin, of Richmond, Va., dealers in plumbers' supplies, have sent an exhibit of their goods to Charleston, S. C., to the Cotton States and West Indian Exposition. Southern manufacturing interests are generally represented.

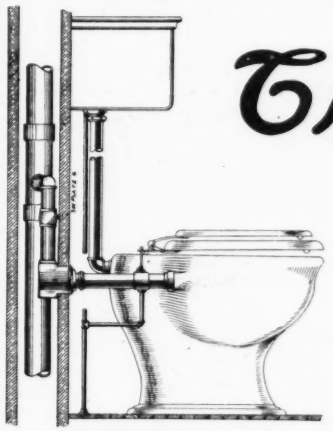


PLATE No. 2.

The "Puritus"

Closet Local Vent Connection

It's a new thing and a good thing, whereby the bath room is always Odorless and Hygenic.

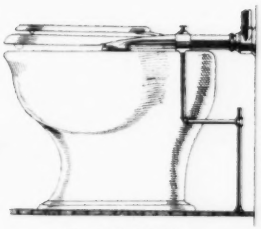


PLATE No. 5.

Attachable to any closet, whether with or without local vent

Plumbers should push it

Results Guaranteed

TESTIMONIALS
GIVEN
THE W. J. SCULLY VENTILATOR COMPANY
DETROIT, MICHIGAN.

Toronto, March 25th, 1901.

Gentlemen:-
At your request I beg to say that I have examined with much interest the "Puritus" Closet Ventilator, whose beginnings I saw two years ago in the hands of the inventor.
The object sought to be attained by the appliance is one I have long hoped to see worked out and I am convinced that the principle adopted is one of the most efficient in the attainment of the end in view.
It seems applicable equally to simple and to larger needs, the work to be done of course depending upon the laws governing systems of ventilation in general. I remain, yours very truly,

(Signed,) P. H. Bryce

Dr. P. H. Bryce is Provincial Health Inspector of Ontario, Canada.

Gentlemen:
Replying to your inquiry concerning your "Puritus" Closet Local Vent Connection will say that it is just what the plumbing trade has long been wanting. It receives my hearty approval and endorsement.
Very truly yours,

Edward N. Hanegan
J. Webster Hanegan & Bro.

President Michigan Master Plumbers' Association and a member of one of the oldest and largest shops in the country.

Gentlemen:
The mechanical construction of the "Puritus" is commendable from a simple, durable and efficient standpoint, and should be adopted by the general public as beneficial to health.
Very truly yours,

E. A. Marsh
Supt. Ideal Manufacturing Co.

Inventor of Marsh Steam Pump and Ideal Volumeter Closet Combination.

Detroit, Mich., November 11, 1901.

Gentlemen:
Replying to your inquiry of recent date would say that a satisfactory appliance to insure perfect local ventilation for closets has long been hoped for--in fact ever since interior bath rooms have become practically universal. We are glad to know that your "Puritus" Local Vent appliance supplies this long felt want and believe that it will continue to receive the constantly increasing usage which its qualities merit. We shall continue to recommend it until it proves inadequate to perform the work claimed for it, which from present appearances will not be in the near future. Yours very respectfully,

Macomber & Higginbotham.

The above concern are well known for their integrity and ability in the architectural profession

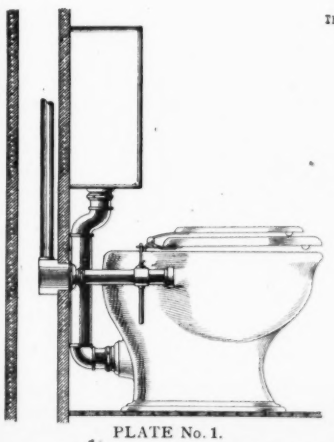


PLATE No. 1.

Write for Catalogue and Price

W. J. Scully Ventilator Co.

DETROIT, MICHIGAN

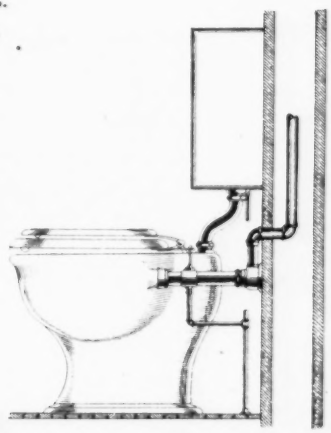


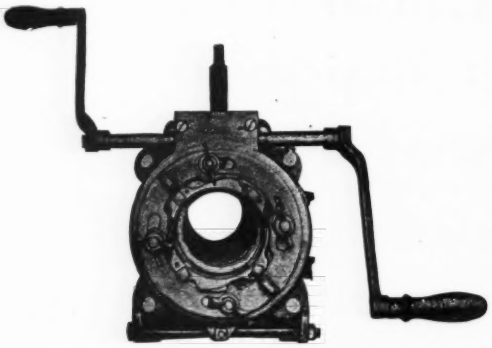
PLATE No. 3.

New Fixture Concern.

James Corday & Co. have incorporated under the Illinois state law to do business in Chicago as manufacturers of gas and electric fixtures. The incorporators are James Corday, F. R. Ferguson and R. D. Hamlin. Capital stock, $10,000.

Combination Vise and Screw Cutter.

This illustration shows the combined vise and screw cutting machine made by Hickman-Melhorn Co., 200-208 Liberty street,



Pittsburg, Pa. The machine saves time and money. Catalogue will be sent upon application, mentioning Domestic Engineering.

Jas. Openshaw, Newport, R. I., has several jobs on hand in which he is using Cooper's Nautilus closets.—Adv.

Contracts Closed.

The New York Continental Jewell Filtration Co., has recently closed important contracts for filtration work with the Empire Worsted Mills, Jamestown, N. Y., and the Standard Paper Co., of Richmond, Va.

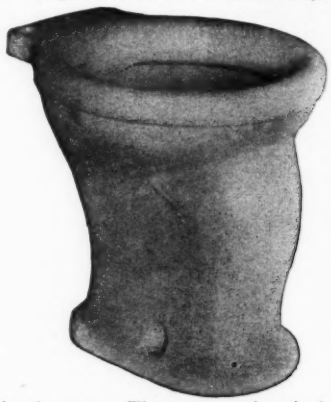
Jacob Bugger, Philadelphia, is plumbing the rectory in the church of Our Lady of Mt. Carmel, using Cooper's closets, lavatories, baths, showers, and other plumbing fixtures.—Adv.

N. E. Smith, Philadelphia, is plumbing a fine residence, using Cooper's baths, and other fixtures.—Adv.

Wilson & Barker, Hutchinson, Kansas, are plumbing a residence in that city, using Cooper's Nautilus closets.—Adv.

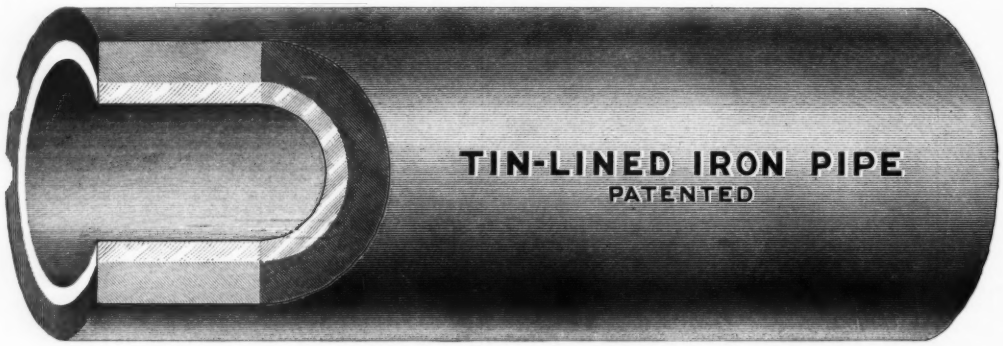
A Plain Washdown Closet.

The Bellmark Pottery Co., sells this number one plain wash down to the supply trade as an improved closet, walls one inch thick giving unusual strength, and adapting the closet for public buildings, schools or other places where closets are subjected



to hard usage. The same style of closet may be had with siphonic action or siphon jet. On application to the above company at Trenton, N. J., mentioning Domestic Engineering, prices of these goods will be sent.

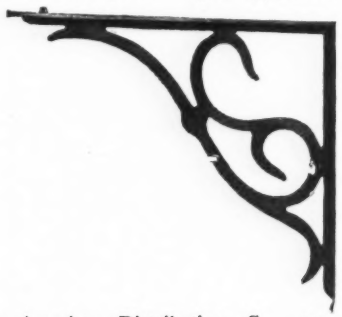
C. F. Miller, Topeka, Kans., has some work on hand in which Cooper's goods are being used.—Adv.



W. W. Mentzinger & Son, Philadelphia, have several operations on hand in which they are using Cooper's goods.—Adv.

Lavatory Brackets.

This new design of lavatory brackets is strong, heavily nickled and the price will be attractive to those who are in the market for such goods. Upon application to



the American Distributing Co., 200-204 Decker street, Syracuse, N. Y., price will be sent if you mention Domestic Engineering.

Smith & Forbes, Boston, are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closet.—Adv.

Tin Lined Iron Pipe.

Lamb & Ritchie, of Cambridgeport, Mass., manufacture tin lined iron pipe for avoiding without extra expense all danger of lead or brass poisoning. The lining cannot be separated from the pipe either by bending or the creeping action of hot water. They also make lead lined iron pipe for vent purposes in the same way. Upon application, mentioning Domestic Engineering, prices will be sent.

Moline Heating & Construction Co., Moline, Ill., are installing some of Cooper's Nautilus closets with Atavic valves in a building in that city.—Adv.

President McKinley's Buffalo Address.

The last public address of President McKinley, delivered at he Pan-American Exposition, September 5th is presented in booklet form to friends of the Ashton Valve Company, 271 Franklin street, Boston. Already the sentiment expressed in this President McKinley's last public address, are beginning to bear fruit in political action and the publishing of the speech in convenient form by the Ashton Company shows a commendable public spirit on their part.

W. H. Walker, Clinton, Mass., has several fine jobs on hand in which he is using Cooper's closets.—Adv.

John C. Gunzer, Chestnut Hill, is remodeling the plumbing in the property of Mr. Samuel Y. Heebner, using Cooper's Nautilus closets, baths, lavatories, etc.—Adv.

Range Boilers.

The Scaife galvanized range boilers have been on the market for 20 years. They have brazed seams thoroughly tested and are heavy, strong and durable. They are adapted for especial use in localities where severe pressure prevails. Complete catalogue will be sent upon application if you write Wm. B. Scaife & Sons, Pittsburg, Pa., mentioning Domestic Engineering.

Channon, Perry & Co., Rock Island, Ill., are remodelling the plumbing in a building in that city, using Cooper's Nautilus closets.—Adv.

Sanitary Patents.

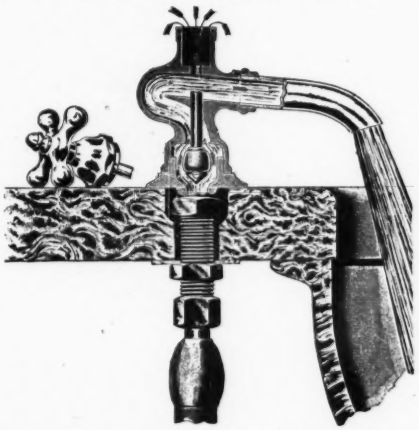
S. S. Sugar, 189 Broadway, New York City, makes a specialty of sanitary and heating patents, trade marks, etc. He invites correspondence, mentioning Domestic Engineering.

Thos. J. Wilson, Phoenixville, Pa., has the contract for plumbing a residence in which Cooper's closets, lavatories and other goods are being used.—Adv.

Stradling Plumbing & Heating Company, Utica, N. Y., have a fine contract on hand in which they are using Cooper's Nautilus closets.—Adv.

THE PERRY SELF-CLOSING FAUCET.

This illustration shows what is really an interesting phenomenon. It is a faucet with a cap off and stem out but it does not leak. Examine it carefully and see the prin-



ciple of operation and then write asking for prices. Leading architects specify this faucet which is made by Peck Bros. Co., 231-237 Washington St., Chicago, Ill.

Hinkle & McDevit, Atlantic City, N. J., are plumbing the house of Mr. Scott, using Cooper's closets, baths lavatories, etc.—Adv.

UTICA FIRM GETS CONTRACT.

The Utica firm of Charles Millar, Son & Co. has been awarded a contract by the Troy Board of Contract and Supply for pipes for the new waterworks extension at $17,399 and for special casting at $375. The other bidders were: M. J. Drummond & Co., New York, $17,695 and $366.27 for special castings; United States Cast Iron Pipe & Foundry Company, $17,116.80 and $375 for special castings, and the Camden Iron Works, $18,533.40 and $375 for special castings.

W. H. Mitchell & Son, of Boston are doing a fine job of plumbing in the Lacessles House at Whitinsville, Mass., using Cooper's "Nautilus".—Adv.

THE ATLAS PIPE WRENCH.

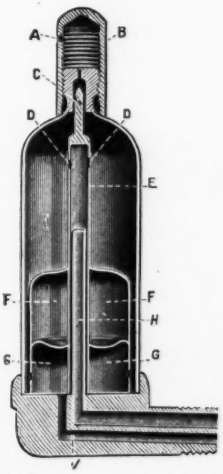
Some of the superior features of the Atlas pipe wrench as claimed by its manufacturers are, that the teeth grip the pipe at an angle and the gripping point is in advance of the handle, showing that in screwing a pipe you are pushing it ahead and that you do not dig into it and drag it as in other pipe wrenches, therefore it

is not crushed. This same action prevents the wrench from locking on the pipe. It is just as effective when fully extended as when used on smaller sizes. The movable jaw as shown in the illustration is shifted from one slot to another, No. 1 slot permitting its use on small pipes, No. 2 on medium size and No. 3 for larger size. The movable jaw is not a screw jaw, therefore has no weak parts. There are no nuts on the wrench to get jammed; no delicate parts to get out of order. It is made of a special wrench steel, drop-forged and every wrench is tested. It is easily and quickly adjusted and is strong, durable and simple. A set of four wrenches will handle all sizes from ⅛ inch wire to 4½ inch pipe Upon application to the Atlas Pipe Wrench Co., 121 Liberty street, New York City, a circular and price list will be sent if you mention DOMESTIC ENGINEERING.

Geo. E. Pratt of Winchester, Mass., has been changing the closets in a fine house at that place, using Cooper's "Nautilus" closet, with the "Atavic" valve.—Adv.

THE ARGON AIR VALVE.

The Argon Mfg. Co., Denver, Col., make the Argon air valve which they claim will stand all tests under which it may be placed, and will do the work expected of an automatic air valve, that it is perfectly reliable and needs no adjustment. Each one is



guaranteed. They ask readers of DOMESTIC ENGINEERING to send for sample, being satisfied that the sample will act as salesman. When you write kindly mention this paper.

Kettswell & Robinson, Philadelphia, Pa., are plumbing the residence of Mr. J. Geo. Klemm, using Cooper's Nautilus closet, bath, lavatories, etc.—Adv.

REMOVES OLD, PREVENTS NEW.

How to remove old scale and prevent new scale from accumulating in the boiler has always ben a vexing problem to engineers. P. A. Clum & Company, brass founders and manufacturers of Rochester, N. Y. claim to have solved the problem by the invention of a device for supplying kerosene oil drop by drop with the feed-water. This it is claimed, disintegrates the old scale, converting it into a lubricated sludge which is easily removed with a hose. Once the boiler is clean the continuous supply of kerosene oil lubricates whatever solid matter is deposited so that the impulse of the blow-off will carry it off by the daily blowing down of one gauge of water.

T. F. Balfe, Omaha, has a contract for plumbing a residence in that city in which he is using several of Cooper's Nautilus closets.—Adv.

I. B. Thorn, Philadelphia, has the contract for plumbing the Fox residence, Ambler, Pa., using Cooper's closets, baths, lavatories, pantry, kitchen and laundry fixtures. —Adv.

Locke Bros., Co., Williamstown, Mass., is installing Cooper's closet in a residence in that city.—Adv.

COMBINED HEATER AND GARBAGE CREMATORY.

The S. Wilks Manufacturing Company, 53-55 S. Clinton street, Chicago, has perfected a heater which serves the double purpose of heating large quantities of water for hotels, apartment houses and private dwellings and at the same time solves the prob-

lem of garbage disposal by utilizing it as fuel. This combination heater is an adaptation of their well-known type of heater to the purpose in hand. The magazine has been enlarged making an entirely new fuel box. The garbage is mixed with the coal in the magazine and becomes thoroughly dried before reaching the fire by the action of the hot gases surrounding the magazine It then feeds down with the coal and is consumed, greatly reducing the amount of coal ordinarily used.

The accompanying cut illustrated the process. A leaflet gives sizes, capacity and prices. It will be sent upon application mentioning DOMESTIC ENGINEERING.

Wm. A. Lowem, Portland, Me., is plumbing the Payson residence, using five of Cooper's Nautilus closets.—Adv.

NEW AMERICAN TUBE COMPANY.

Word Comes from Sault St. Marie, Mich., that the immense steel tube works, originally projected for the Canadian Soo, will instead be located on this side of the river. The proposed plant will cost more than a million dollars. Orders for machinery have been placed and work on the plant will be commenced at an early date. It will be finished in time to start operations upon the completion of the water power canal next year. The new concern will be known as the International Tube company. The manufacture of steel seamless lap welded and butt welded tubes used for water pipes, steam pipes in boilers and for other purposes will be the business of the new company.

THE SISSON INSERTABLE JOINT.

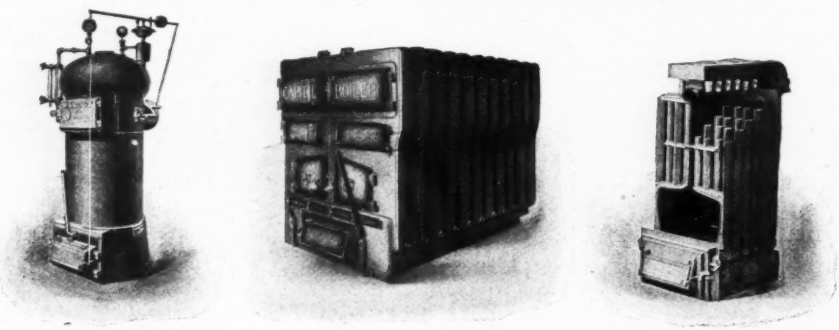
This illustration shows the Sisson insertable joint for soil pipe showing that it is not necessary to take down the pipe for several lengths in order to insert a joint which may be found defective or which

may have become defective after use. It is manufactured by R. Estabrook's Sons, South Boston, Mass., and price will be sent upon application, mentioning DOMESTIC ENGINEERING.

D. F. Durkin, Jr., Philadelphia, is plumbing the residence of Mr. Ramsey, using Cooper's closets, baths, lavatories, etc.—Adv.

THREE GOOD HEATERS.

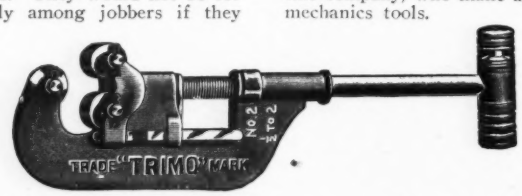
The "Capitol" boilers made by the United States Heater Co., Detroit, Mich., make a good line for the heating contractor to handle. The accompanying illustrations show their range of capacities which are



from 200 to 8,000 feet for steam and from 300 to 3,200 feet for hot water. Complete catalogue showing the various styles in detail will be sent upon application, mentioning DOMESTIC ENGINEERING.

TRIMO TOOLS.

Go where you will in plumbing, heating or mill supply houses in the United States and you will see prominently displayed the Trimo pipe tools. They would not be for sale as generally among jobbers if they



were not good tools. They are drop forged steel and no expense is spared to make them strong and durable. Upon application, mentioning DOMESTIC ENGINEERING, to the Trimont Mfg. Co., Roxbury, Mass., catalogue will be sent.

H. Kelly & Co., Minneapolis, Minn., are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

A GOOD SIPHON ACTION HOPPER AND TRAP.

The Trenton Potteries Co., Trenton, N. J., make this siphon action hopper and trap which is a fine working fixture. It has a three-inch seal against sewer gas, and extra water surface in the bowl, large open-

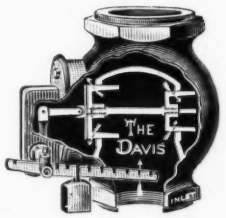
ings through the traps, roughs in 8¾ inches to end of tail piece, or 12 inches with low down tank, ¾ supply for high tank and 2 inches for low tank. This is No. 21 and is Fig. 307B in their catalogue which will be sent to the trade upon application, mentioning DOMESTIC ENGINEERING.

NEW PLUMBER'S LEVEL.

A clever variation for the usual practice gives the Athol Machine Company, Athol, Mass., a plumber's level which enables the user to place the level in line with the pipe as readily as on a flat surface. A simple groove in the bottom of the level makes this possible. This is but one of the practical novelities manufactured by this company, who make a specialty of fine mechanics tools.

THE DAVIS VALVE.

For a sensative and tight noiseless back pressure valve the Davis is well adapted to meet the requirements of modern vacuum and low pressure heating systems. Its semi-balanced sliding valve is weighted merely to overcome the difference in the areas of the two discs, the total of these areas equaling that of the pipe. In consequence there is no hammering as is the case with the old style single disc valve in which the weighting had to balance the entire pressure. The pounding and wear soon wore out the valve seat causing leakage. A dash pot might be added but that would complicate matters and, would require time and attention. All these difficulties have been done away with and a neat compact and simple device has superceded the old styles. The friction is eliminated by the sliding valve controlled by the small weight which is about a quarter



of that used in other valves. The operation is noiseless and the valve is sensitive although made in a strong and durable manner. It can be placed in any position without impairing its action. All these points recommend it to the attention of anyone in the market for such a valve. Further information can be had upon application to the manufacturers, the G. M. Davis Regulator Company, at 106 North Clinton street, Chicago, Illinois, if you mention DOMESTIC ENGINEERING.

Harry Morris & Co., Racine, Wis., have some alteration work on hand in which Cooper's Nautilus closets are being used.—Adv.

TIME O' YEAR FOR EM.

This seems to be the time of the year for new catalogues. A number of the manufacturers and jobbers in the plumbing and steam supply and heating trades are surprising their customers and friends at this time with creations in the catalogue line that are really artistic. If DOMESTIC ENGINERRING has missed mentioning any of the new ones their owners will consider it a favor to both sides to mail a copy of their latest 'logue to this journal at 89 Center street, New York City, at their earliest convenience. DOMESTIC ENGINEERING is always glad to make mention of such things in its news columns.

THE DRAKE NEW MODEL ACETYLENE BURNER.

The Drake Acetylene Apparatus Co., 37 Hathaway street, Cleveland, O., has brought out a new self-cleaning, adjustable burner ¾ and one foot sizes. It has been reduced in weight so that the least possible amount of heat is generated. Its alignment can always be adjusted perfectly. Either side may be turned off and the remaining light turned down for a pilot or night light and still have the full pressure

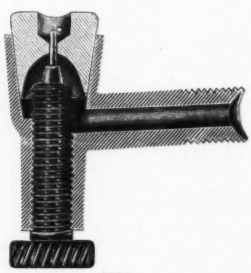


FIG. 2.

of the generator at the point where the gas is liberated. The burner is shown in Fig. 1, the cross section of the cleaning device in Fig. 2. A similar burner but without the self-cleaning device is style No. 3 which is

adjustable so far as alignment is concerned but not having the cleaning attachment, is cheaper. A new idea that the company puts forth is that acetylene burners should not be destroyed after they get worn or out of repair. If they are sent to the company they will be made as good as new and returned at a cost so small that it will be appreciated by the user of acetylene burners. When writing for price of these burners kindly mention DOMESTIC ENGINEERING.

FIG. 3.

THE MARSH THERMOSTATIC VALVE.

The Marsh thermostatic valve is shown herewith. It is especially designed to discharge water of condensation in the entire heating apparatus and preventing the waste of steam. It is extensively used in connection with a vacuum pump for a vacuum system of steam heating and the manufacturers claim that over 50,000 of them are now used. It is thoroughly protected by patents. Jas. P. Marsh & Co., 224-226 Washington street, Chicago, Ill., are the makers of the valve and would be glad to quote prices upon application, mentioning DOMESTIC ENGINEERING.

PLUMBING SPECIALTIES.

The American Distributing Co., 200-204 Decker street, Syracuse, N. Y., H. Romeyn Smith, president, calls attention in a folder of recent issue to a few of their plumbing specialties, such as lavatory brackets, torches, bib seat dressers, ferrules, etc. The company makes a specialty of aluminum, brass and bronze casting, silver and nickel plating, wood and brass pattern making, etc. In writing to them kindly mention DOMESTIC ENGINEERING.

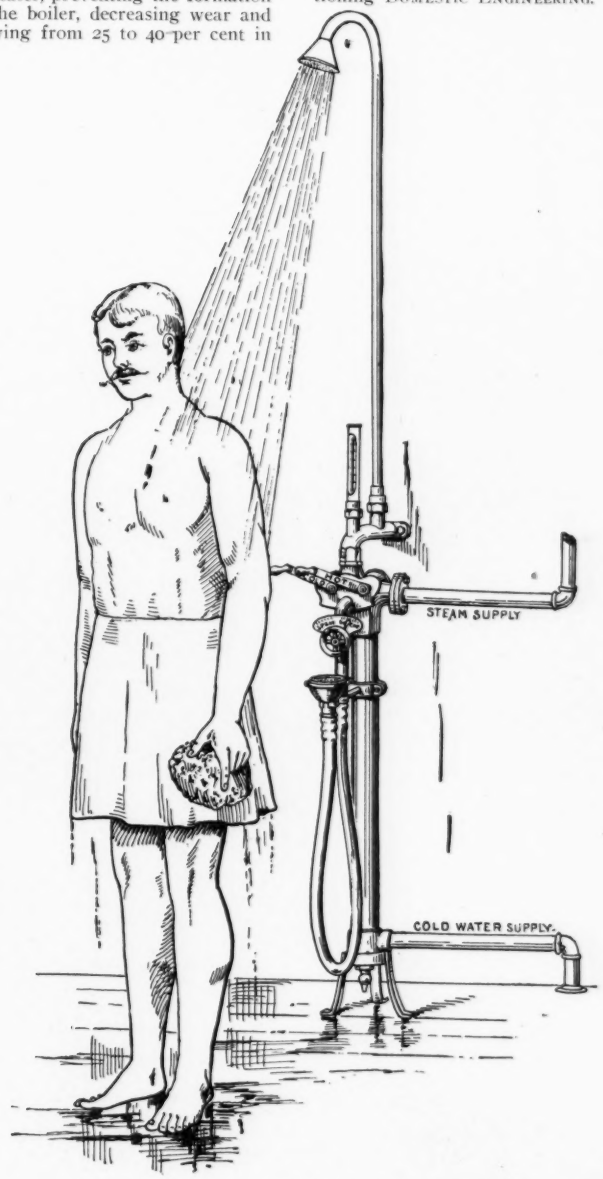
THE "GEGENSTROM" APPARATUS.

The Gegenstrom apparatus for which the Rundle-Spence Mfg C.o., of Milwaukee, are western agents, is for the instantaneous production of hot water at any desired temperature by means of exhaust or low pressure steam. It is especially adapted for breweries, factories, laundries, apartment houses, hotels, etc. This is what it does:

1.—It instantly produces hot water at any temperature and in any desired quantity.

2.—It condenses the exhaust steam perfectly without back pressure on the engine.

3.—It has an extraordinary capacity as a feed water heater, preventing the formation of scale in the boiler, decreasing wear and tear, and saving from 25 to 40 per cent in fuel.



4.—It has a perfect provision for free expansion of the heating tubes.

5.—It is so small that it can be placed in corners and cramped places.

6.—It is adapted not only to new buildings but to all places where other systems for providing hot water are already fitted up.

The illustration shows its application to rain baths in institutions, reformatories, prisons, insane asylums, armories and peoples' bathing establishments where hot water is desired, the temperature to be beyond the control of the user. Upon application, mentioning DOMESTIC ENGINEERING, the Gegenstrom catalogue which describes the various uses of it will be sent.

Frank J. Eustace, Philadelphia, is installing Cooper's closets in a residence in that city.—Adv.

PULLEYS.

Several simple and reliable forms of wood-split pulleys are manufactured by A. Burlingame Company, 22 Cypress street, Worcester, Mass. They will be glad to send descriptive matter to interested parties mentioning DOMESTIC ENGINEERING.

SHAFTING APPURTENANCES.

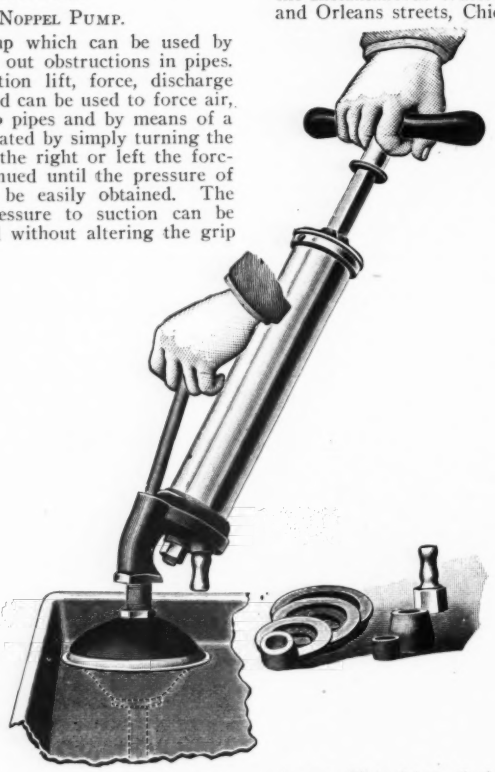
A small catalogue published by Geo. M. Naylor, 380 West Broadway, New York, is devoted to shafting appurtenances, power transmitting machinery and mill supplies. It shows a number of designs of hangers and floor stands, boxes, pillow blocks, oiling boxes, etc.

The R. P. Willis Co., Springfield, O., have some work on hand in which they are using Cooper's Nautilus closets.—Adv.

Lowden Bros., Boston, are installing some of Cooper's goods in an operation they have on hand.—Adv.

THE NOPPEL PUMP.

This is a pump which can be used by any one to clean out obstructions in pipes. It is a combination lift, force, discharge and test pump and can be used to force air, water or gas into pipes and by means of a rotary valve operated by simply turning the handle either to the right or left the forcing can be continued until the pressure of 100 pounds can be easily obtained. The change from pressure to suction can be instantly effected without altering the grip

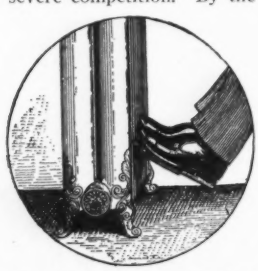


of the person operating the pump or its connections. If the handle of the piston is turned into a position half way between extreme right and left the rotary valve will be closed and the pressure which is attained in the pipe can be held, thus using the pump as a test pump. Al these advantages make the Noppel pump an extremely useful one. Circular describing it will be sent upon application to the Noppel Pump Co., Hartford, Conn., if you mention DOMESTIC ENGIEERING.

Thos. R. Catton, New Haven, Conn., has some alteration work on hand in which Cooper's Nautilus closets are being used.—Adv.

THE RESTFOOT WARMER.

The steam or hot water heating contractor who is able to put a few of these restfoot warmers on a job will often find the "throwing in" of articles to be the things which will give him the contract in the case of severe competition. By the use of



this foot warmer feet are warmed resting and the shoes not burned. When not in use the warmer folds up automatically against the radiator and one bolt fastens it on the radiator in position. The Fred H. Knapp Co., 42 River street, Chicago, Ill., will be glad to quote prices upon application, mentioning DOMESTIC ENGINEERING.

THE ACME NO. 12.

The latest water heater brought out by the Instantaneous Water Heating Co., Ohio and Orleans streets, Chicago, is the No. 12 Acme. This heater is built on the principles of the old Douglas No. 2 which was the father of instantaneous water heaters. This principle of construction prevents the products of gas combustion and the water from coming into contact. The heater is

designed in new and artistic lines and contains a large heating surface. It is fitted with a new burner, automatic safety lock and water pressure regulator. A new catalogue will be sent which describes this latest heater as well as all the others of their large and perfect line. In writing please mention DOMESTIC ENGINEERING.

F. W. Gleason & Co., Hyde Park, Mass., are plumbing a residence in that city, using Cooper's Nautilus closets, lavatories, baths, etc.—Adv.

F. H. O'Neil, Philadelphia, is plumbing the Biddle residence on Locust street, using Cooper's goods.—Adv.

A CLEVER DEVICE.

We are glad of the opportunity to show herewith a picture of the new Universal radiator valve of which we made editorial mention several weeks ago. The flexible joint at bottom permits of its being used as a right or left hand corner valve, as an offset globe valve or at any arc of circle which may be necessary. The valve is shown

with the least distance between centers of inlet and outlet. This can be increased as desired. It is manufactured by the Kelly & Jones Company, of New York, Pittsburg Chicago, who will gladly quote prices and furnish further particulars upon request.

OF COURSE IT PAYS.

As an illustration of the fact that advertising seed seldom die, though they may lie long dormant, DOMESTIC ENGINEERING received this week an inquiry as to whether we still published a list of jobbers and manufacturers as advertised on page five of our May 30th, 1895, edition. We thought everyone in the trade knew about this directory, but here was a firm which had never before heard of it until a six-year-old copy of DOMESTIC ENGINEERING fell into their hands. Of course we were glad to tell them of the progress we have made with our directory and that this year for the first time it can truly be called a *World* directory of manufacturers and jobbers of plumbing, gas and steam, engine, mining and mill supplies. But as Kipling would say, that's another story. The moral is obvious.

A NEW SANITARY COMPANY.

An application will be made December 9 to the Governor of Pennsylvania for a charter for a Corporation to be known as the Anchor Sanitary Company to be located at Pittsburg. The officers of the Company are as folows: O. C. G. Brettell, President; T. J. Duncan, Vice-President; James B. Lantz , Secretary; Harry L. Andrews, Treasurer; John F. Bailey, Manager.

All the above with the exception of Mr. Duncan are graduates of the Bailey-Farrell Manufacturing Company, one of the oldest and best known houses in the United States.

Mr. Lantz has represented the B. F. Manufacturing Company on the road for about twelve years while Mr. Brettell has been their city representative for about seventeen years and Mr. Andrews has ben purchasing agent for the firm for seventeen years. The new company expect to be ready for business January 1st, 1902.

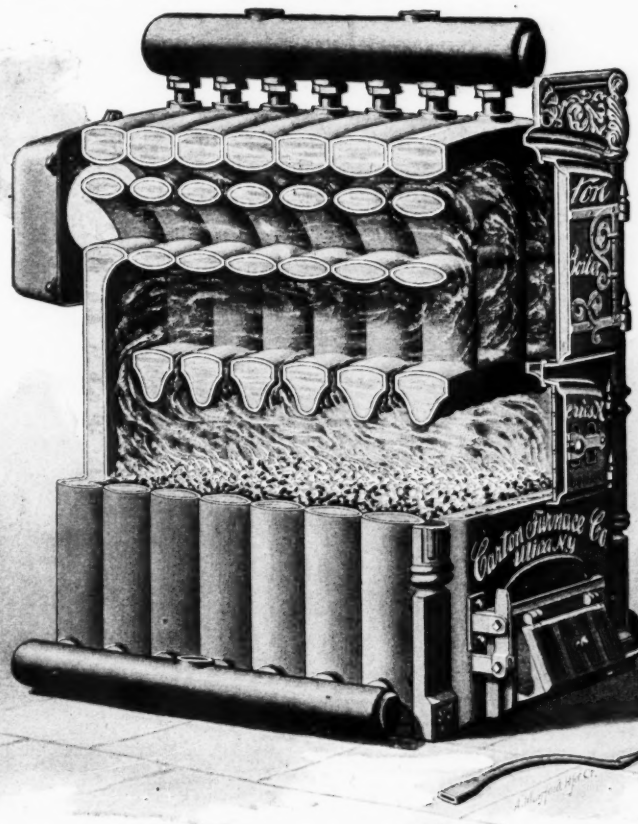
THE ASHTON POP SAFETY VALVE.

This cam lever pop safety valve has been accepted by the United States navy department and board of supervising inspectors of steam vessels, as specially adapted for marine service. It is made in two styles,

one in composition metal and one with iron shell and composition metal working parts. We show the latter form of construction. A catalogue which shows both forms and other goods made by the Ashton Valve Co., Boston, Mass., will be sent upon application, mentioning DOMESTIC ENGINEERIG.

THE CARTON BOILER.

75 per cent of fire surface is claimed in the Carton boiler, an illustration of which we show herewith. The crown sheet and course of fire currents will show the strong points of construction in this boiler. It is



an original boiler based on scientific calculation. In Paris this heater was awarded the Gold Medal. It is made of steam or hot water and catalogue describing it and giving prices will be sent upon application if you mention DOMESTIC ENGINEERING.

J. E. Eyanson & Son., Philadelphia, are plumbing the residence of Mr. A. H. Todd in the Catskill Mountains, using Cooper's Nautilus closet.—Adv.

A POWERFUL FACTOR.

Last August The Norristown Covering Company, of Norristown, Pa., manufacturers of a high grade of boiler and pipe coverings, concluded to try DOMESTIC ENGINEERING with a small ad in both weekly and monthly as a "feeler," so to speak. In three months' time they undoubtedly have come to feel grateful for the move made in speaking, though in a limited way, through the columns of the most powerful trade journal of its class in the world. We are pleased to state that from this week on readers and buyers of the five great editions of DOMESTIC ENGINEERING will not need magnifying glasses to recognize their ½ page in the Weekly and ¼ page in the monthly. DOMESTIC ENGINEERING is always on the alert for good firms of their kind who make standard goods and we have the most extensive facilities of any journal of the kind for introducing such goods to proper buyers. Makers of "fake" articles are not wanted as advertisers in our columns and are given to understand this, but no company, individual, or firm with a good article used in the plumbing, heating, lighting, or mill supply trade need hesitate about using the columns of these journals. Our high class advertisers are a living guarantee of the standard quality of DOMESTIC ENGINEERING.

J. F. Wolschlagel, Philadelphia, is plumbing an Overbrook residence, using Cooper's goods.—Adv.

CLIMAX RATCHET STOCK.

C. M. Kemp Mfg. Co., Baltimore, Md., make the Climax stock for use in threading iron pipe in ditches, under floors, corners, overhead and difficult places. It is not necessary to dig up or take out whole lengths of pipe to make repairs. The defective part of the pipe can be cut out and threads cut on the part in the ground with the greatest ease and convenience, not only

saving time but avoiding unnecessary and disagreeable work. Write to manufacturers for catalogue, mentioning DOMESTIC ENGINEERING.

E. D. Hornbrook, Kansas City, is plumbing a fine residence in that city, using Cooper's Nautilus closet.—Adv.

NEW SCHEDULE OF STANDARDS.

The National Association of Master Steam and Hot Water Fitters is sending out from national headquarters, 260 West Broadway, New York City, a schedule of standard flanges for extra heavy iron pipe, fittings and valves, as adopted June 28th, 1901, at a meeting of valve and fitting manufacturers for pressures, 125 to 250 lbs. to the square inch. Side by side with this is the standard adopted July 18th, 1894, by a committee of the Master Steam and Hot Water Fitters' Association, the American Society of Mechanical Engineers and the representatives of the leading valve and fitting manufacturers in the United States. It is a handy arrangement fo comparison.

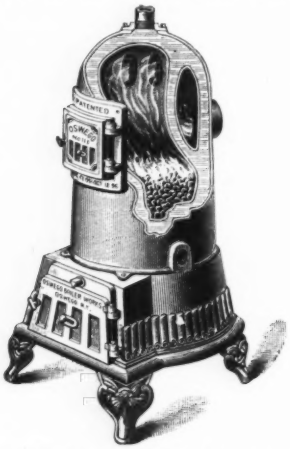
Lamping Bros., Cincinnati, are remodeling plumbing in a residence in that city using Cooper's Nautilus closets.—Adv.

WILL INCORPORATE.

A new company has been organized and incorporation papers filed by Wm. A. Somers, Frederick K. Fitler, Louis S. Clarke and William A. Todd to do business under the name of Somers, Fitler & Todd Co., at Pittsburg. The company will manufacture and sell all kinds of supplies for contractors, mills, mines, foundries, etc.

TANK HEATERS.

The Oswego Boiler Works, Oswego, N. Y., make a large line of house and tank heaters. The little heater we show herewith is one of the line. Their larger boilers are



just as efficient. They want you to get their catalogue. They have everything in the boiler line for low and high pressure. In writing kindly mention DOMESTIC ENGINEERING.

NOVEL PEN HOLDER.

A unique advertising novelty is a pen holder in the shape of a twist drill presented by the Standard Tool Company, of Cleveland, O. It bears the well-known shield which is the distinguishing mark of all "Standard" tools. A single pen holder will be sent upon request. If a second is desired it will be sent upon receipt of fifteen cents. Kindly mention DOMESTIC ENGINEERING when writing.

WELL PROTECTED.

James A. Trane, patentee of the Trane vacuum system of heating, advises that he has secured letters patent on his system in Canada, England, France, Belgium, and Germany, as well as in the United States. He is certainly well protected.

A PHENOMINAL YEAR'S BUSINESS.

The Electric Heat Regulator Co., of Minneapolis, Minn., are closing up the largest year's business in the history of the company. Their plant is running night and day in a vain endeavor to keep pace with their orders. They manufacture an automatic regulator for furnaces, steam and hot water heaters which has stood the test of time and is to-day more popular than ever.

CONTEMPLATED IMPROVEMENTS.

The Fowler Radiator & Mfg. Co., Johnstown, Pa., have bought an additional piece of ground 100x320 feet joining their property from the Lorain Steel Co. and contemplate making a number of improvements and an extension to their plant in the near future, as they intend to add quite a number of new patterns to their line.

TRADE IN INDIANA.

That section of Indiana of which Indianapolis is the distributing centre, is enjoying a large and rapidly growing trade in plumbing and heating goods. Numbers of towns are putting in water works, and these are increasing the army of consumers of sanitary goods. Steam and hot water heating is being introduced into the smaller places and rapidly increasing the demand for modern methods of house-warming. The position of Indianapolis as a distributing center for these goods is certain to encrease in importance. The three jobbing houses there all report largely increased business over last year. There is a rumor that another jobbing house will enter the field there next year.

Not how many but how few types is our guide. Some manufacturers have a mania for adding new types and kinds of heaters to their kind. We have put all our brains into the "Winchester" and have striven to have it the best, and so far have been successful. Smith & Thayer Co., Boston, Mass.

TRADE WANTS.

TRAVELING MEN, ATTENTION—WE HAVE some taking specialties in the heating line which we desire traveling men to present as "side lines" to the trade. We shall be glad to correspond with those who can furnish satisfactory references. Address, 1882, care Domestic Engineering, 64 N. Jefferson St., Chicago. t.f.

PLUMBERS AND STEAM FITTERS MAKE best agents for specialties in sanitary and heating lines. We desire five hundred plumbers and steam fitters of good repute who can furnish satisfactory references, to act as introducing agents for our specialties to the consuming trade. We pay liberal commission but only desire to do business with those whose reference is satisfactory. Address, 1817, care Domestic Engineering, 64 N Jefferson St., Chicago t.f.

Domestic Engineering

Monthly Edition.

Plumbing, Heating, Lighting, Ventilating Engine, Mining and Mill Supplies.

Office of publication: 58-64 N. Jefferson st., Chicago.

JNO K. ALLEN . . . . President and Treasurer
HERBERT T. SHERRIFF . . . . . Editor
ELMER CRAWFORD . . . . . Manager

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FRANK P. KEENEY.

Mechanical Department
F. Chas. Hill . . . . . Superintendent
Evan H. Sample . . . Foreman Pressroom

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18-24 S. Seventh St. Telephone 21-41.
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VICTOR H. ROSS.

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Copy and cuts for monthly advertisements should be received by the first of the month, for weekly edition not later than Tuesdays. We cannot guarantee insertions or changes in advertisements if received later.

Entered in the Post-office in Chicago, Illinois, as mail matter of the second class.

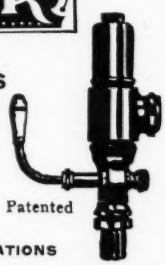
Member of the Trade Press Association.

DECEMBER 15, 1901

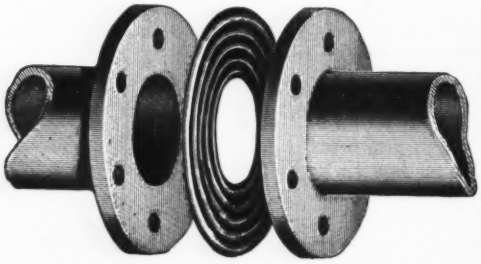
THE FLUSHOMETER

Showing application of Flushometer.

The Kenney System
FOR FLUSHING WATER CLOSETS
The only system that will operate successfully at all times one or any number of closets under the varying conditions of water pressures. NO NOISY AND DIRTY OVERHEAD TANKS. NO CUP LEATHERS OR SPRINGS.
Endorsed by sanitary engineers and plumbers.
FLUSHOMETER
TRADE MARK
Patented



SEND FOR CATALOGUE AND LIST OF RECENT INSTALLATIONS
THE KENNEY CO., 72-74 Trinity Place, NEW YORK.



OUR PATENTED
MINERAL WOOL PIPE COVERING AND COPPER GASKETS
THEY SAVE STEAM AND MAKE ABSOLUTELY TIGHT JOINTS
BEST AND CHEAPEST
SAMPLES FREE
UNITED STATES MINERAL WOOL CO.
143 Liberty Street, NEW YORK.

THOMSON

Meter Company

79 Washington St., Brooklyn, N. Y.

25,145 Water Meters sold in 1899.

26,414 Water Meters sold from January 1st, 1900, to January 1st, 1901.

176,717 Water Meters sold to January 1st, 1901.

We Stamp our Meters only as they are sold.

TRIMO
PIPE TOOLS

All these tools are drop forged from steel. No others made so strong and durable. No expense spared to make the best. Give them a trial and be convinced.

TRIMO PIPE CUTTER is convertible from a single wheel with rolls, into a three-wheel cutter, by substituting the two extra cutting wheels that accompany each tool, to be found in the handle, which is provided with a receptacle for same. (See cut.)

TRIMONT MFG. CO.

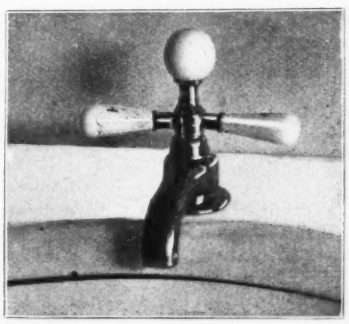
SOLD BY ALL JOBBERS. ROXBURY, MASS.

The Boylston Basin Supply Combination

PATENTED.

A LAVATORY FIXTURE.

That supplies *Hot, Cold* or *Mixed* water and operates the *Waste* through only *One Hole* in the slab, as simple as a Fuller Stop Cock. Will deliver a *very small stream* or *full force* at *any desired temperature* from any pressure.

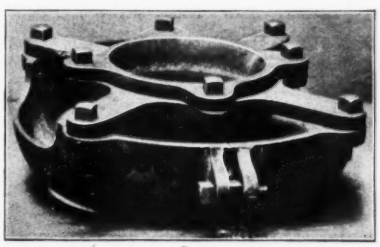


Wm. Bunting, Jr.

MANUFACTURER

388 Boylston St., Boston, Mass.

No More Broken Joints



Replaces cement joint between iron soil pipe and earthenware sewer pipe, keeping sewer gas absolutely out. There is no "IF" about it. Our circular free.

GEORGE F. RYAN & COMPANY

3811 COTTAGE GROVE AVE., CHICAGO, ILLINOIS.

Highest Award for Pipe Wrenches

ATLAS PIPE WRENCHES RECEIVE HIGHEST AWARD AT PAN-AMERICAN EXPOSITION.

Ask your supply man for the "ATLAS"

If you are not using the "ATLAS" (The Pipe Wrench with the three slot adjustment) give it a trial and and we believe you will be satisfied. Made in Four Sizes—10 in., 18 in., 24 in. and 36 in., handling everything from ⅛ inch wire to 4½ inch pipe.

Manufactured by

ATLAS PIPE WRENCH CO.

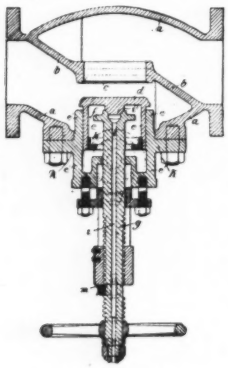
Flood Building, San Francisco, Cal.

121 Liberty Street New York

PATENTS AND INVENTIONS

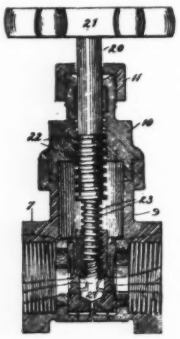
R. Maitland & Son, Clinton, Mass., are plumbing a residence in that city, using Cooper's closets, lavatories, baths, etc.—Adv.

677,470. Steam-Valve. Ottokar Richter Kiel, Germany.



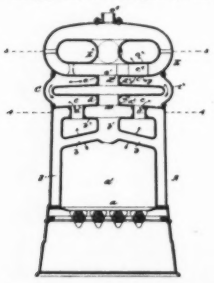
Sproul & McGurrin, Grand Rapids, Mich., are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

679,051. Gate Valve. Alfred M. Hewlett, Kewanee, Ill.



Robert W. Kyle, Wheeling, W. Va., recently installed one of Cooper's filters in a residence in that city.—Adv.

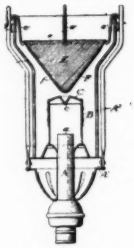
675,352. Hot-water and steam heater. Werter C. Higgins, Arlington, Mass.



Wolfenden Bros., Darby, Pa., are installing Cooper's Nautilus closets in a residence in that city.—Adv.

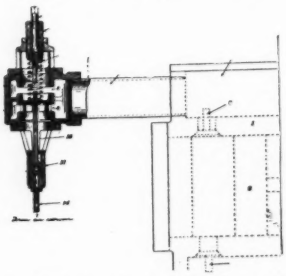
Robt. W. Kyle, Wheeling, W. Va., has the contract to plumb a fine residence, in which Cooper's Nautilus closets will be used.—Adv.

675,951.—Incandescent Lighting Device. Joseph P. Keating, Philadelphia, Pa.



John Ahern, Saginaw, Mich., has some alteration work on hand in which he is using Cooper's Nautilus.—Adv.

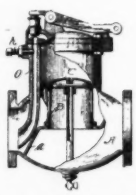
675,340. Regulator for air or gas compressors. William Prellwitz, Easton, Pa., assignor to the Ingersoll-Sargeant Drill Company, New York, N. Y.



W. J. McGuire & Co., Toronto, are installing Cooper's Nautilus closets in a residence in that city.—Adv.

675,336. Pipe connection for valves, etc. Charles Luke, Milford, Conn., assignor to the New Haven Novelty Machine Company, New Haven, Conn.

675,946.—Valve. Charles Gulland, Pittsburg, Pa.



John C. Gunzer, Chestnut Hill, is plumbing the Patterson residence, using Cooper's Nautilus closets.—Adv.

685,493. Ventilation of Water-Closets. William H. Stilwell, Binghamton, N. Y.

685,597. Cock. Henry Gibbs, Chicago, Ill., assignor to W. D. Allen Manufacturing Company, Chicago, Ill., a Corporation.

M. J. Duffy, Louisville, is plumbing the city hospital, using Cooper's Clipper cocks throughout.—Adv.

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Designs, Caveats, Trade Marks, Copyrights, Etc.
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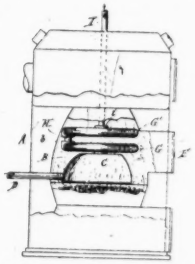
DYER, EDMONDS & DYER
PATENTS
31 Nassau Street New York City
have done all my patent
soliciting work for this and foreign
countries continuously since 1872
Thomas A Edison

679,543. Valve for Gas or Other Pipes. Edward S. Root and Chares S. Demarest, New York, N. Y.

Drew & Co., Philadelphia, are plumbing the residence of Mrs. Zane on Girard Ave., using Cooper's goods.—Adv.

680,744. Hot Water Heating Attachment for Furnaces. Frank D. Stolz, Chicago, Ill.



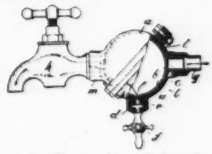
Harry Beniston, Norwood, Pa., has some work on hand in which he is using Cooper's closets and other fixtures.—Adv.

Herman H. Russ & Sons, Albany, N. Y., are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

680,866. Pipe Cutter. Albert Katzki, Erie, Pa.

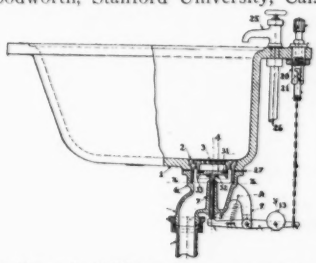
Leary & Malone, Little Falls, N. Y., are plumbing a fine residence in that city, using Cooper's Nautilus closets, lavatories, baths and other plumbing fixtures.—Adv.

680,681. Filter for Purifying Water. Auguste F. Avezard, Jr., and Jules E. Clere, Paris, France.



Saunders & Esswein, Columbus, O., are installing Cooper's closets in a residence in that city.—Adv.

685,660. Lavatory or Bath. George L. Woodworth, Stanford University, Cal.

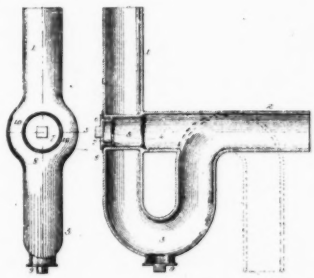


Sullivan & Callihan, Boston, are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

WE are making a specialty of fine China articles for metal mountings. Scalp marks and China handles of every description. Samples furnished on application.

THOMAS MADDOCK & SONS,
TRENTON, N. J.

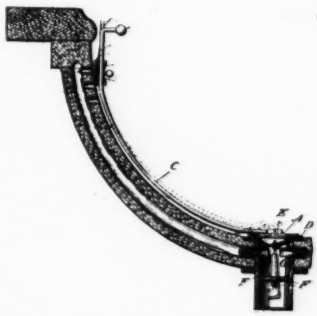
683,884. Water-Seal Trap. Thomas F. Payne, Spokane, Wash.



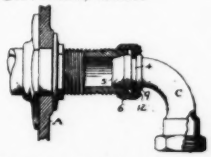
Cope Pattern Works
Detroit, Mich.
Steam and Hot Water Boilers, Radiators, etc.

WOOD PATTERNS
BALKWILL PATTERN WORKS
970 Hamilton Street, Cleveland, O.

680,592 — Waste-valve for washbowls, bath-tubs, etc. John A. Hollenberger, Hagerstown, Md.

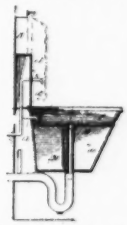


682,250. Coupling-Joint. Joseph H. Glauber, Cleveland, Ohio.

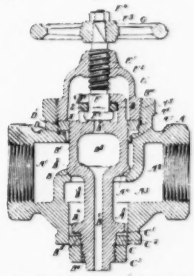


Grant Jenkins & Co., Philadelphia, are plumbing a Chestnut street residence, using Cooper's baths, lavatories, etc.—Adv.

682,482. Combined Sink and Washtub. Walter J. Minns, New York, N. Y.



680,737. Valve. Louis Schutte, Philadelphia, Pa.



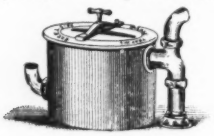
W. B. Coffee Plumbing Co., Tacoma, Wash., are installing Cooper's closets in a residence in that city.—Adv.

Officially Recognized.

Official announcement is made by the National Committee of the Confederated Supply Associations that the names of P. A. Vozel & Son, Louisville, Ky., and Libbey Parker & Co., Boston, Mass., have been added to the official list of legitimate jobbers.

The Excelsior Grease Trap.

No part of the house waste is more troublesome to care for than grease from the kitchen sink and in order to care for it satisfactorily a good grease trap must be provided. Sproul & McGurrin, Grand Rapids, Mich., make a trap for this purpose



known as the Excelsior which we show herewith. It comes in two sizes, one for hotels and restaurants or places where large quantities of greasy water are being discharged, and the other for houses. Upon application prices will be sent if you mention Domestic Engineering.

Big Fire Loss of National Enameling and Stamping Company.

The Brooklyn, N. Y., plant of the National Enameling and Stamping Company was destroyed by fire early in the morning of Thanksgiving day. Geo Koch, a watchman, lost his life in the flames. The company's loss is estimated at half a million, probably well covered by insurance.

Believe in Expositions.

The Atlas Pipe Wrench Co., manufacturers of the Atlas Pipe Wrench, are believers in expositions—as their sales of pipe wrenches show a wonderful increase in the last few months, a great deal of it due directly to the Pan-American Exposition, at which they gave a practical demonstration of the workings of the pipe wrench, and were awarded the highest medal for pipe wrenches.

Honor for Supply Man.

As the trade will remember, E. W. Fisher of the E. W. Fisher Co., of Cleveland, was elected last spring a member of the Cleveland school council by the second highest vote cast for any member of the council. It now appears that Mr. Fisher's many friends are determined to nominate him on the republican ticket at the spring election for School Director. As Mr. Fisher is in no sense a politician these honors are very flattering

Successful—Will Enlarge.

The Limberg Enamelling Company, of 1316 Pendleton street, Cincinnati, reports having had encouraging success in producing porcelain enamelled baths, and it is believed contemplate enlarging their capacity soon.

A Strong Company.

The Ideal Mfg. Co., of Detroit, Mich., are sending the following circular letter to the trade this month. It speaks for itself:

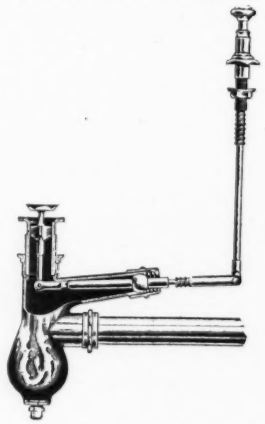
The great demand for the Ideal Volumeters, low tank combinations, centrifugal traps, fine thread tools and fittings, has demonstrated to the officers of The Ideal Manufacturing Company that the plumber appreciates the manufacturer who invests his capital in the interests of the trade. and, with this encouragement, increased facilities have been added to our plans, making it the largest factory in the world manufacturing high grade plumbing specialties, and in such form as to enable the plumber, by the use of adjustable traps and nickel plated fittings, to install all kinds of special work at a great reduction in cost.

We cut and fit nickel plate tubing to sketch, for all kinds of special work, for railings, vent and waste pipes, free, no charge for labor. Write for further information.

Yours respectfully,
The Ideal Mfg. Co.

The Sanitary Waste.

The H. M. Weaver Co., Mansfield, O., makes this sanitary waste which takes the place of the old style standing waste and overflow. This waste takes less room to rough in the fixtures than other styles of standing wastes. It has a metal plug which closes the waste in the tub at the point where the water leaves the fixture. This plug is operated by a rod at the side of the



fixture. There is no complex catch to adjust when operating or closing. It is made ball bearing and only requires a touch of the handle to open or close. Upon application, mentioning Domestic Engineering, a beautiful catalogue will be sent you.

Special Price on this Lavatory

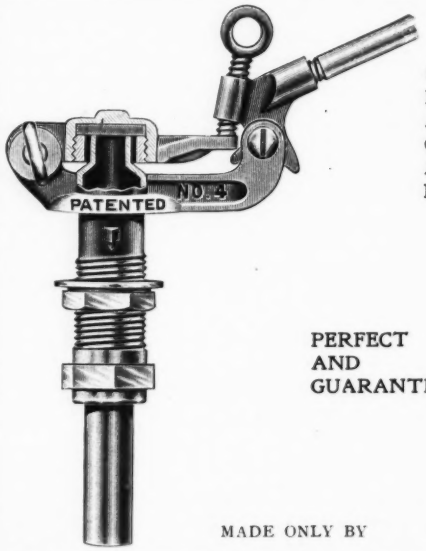
Having bought the entire stock of Lavatories of an Enameller, we are prepared to quote

specially attractive prices on this and other patterns. It will pay you to write us.

Union Mfg. and Supply Co., 317-319 Second Avenue,
Manufacturers and Jobbers of Plumbing Supplies. PITTSBURG, PA.

The best pump in the world cannot lift water from a dry well, but there is water down lower and a dry time is the best time to dig for it.

DALE
High Pressure Ball Cock



CANNOT POUND.
ALWAYS CLOSES.
ACCESSIBLE.
DURABLE.

PERFECT AND GUARANTEED.

MADE ONLY BY
WOLVERINE BRASS WORKS
GRAND RAPIDS, MICH.

WE OFFER YOU:—

Enameled Flat and Roll Rim Kitchen Sinks.
Enameled Corner and Flat Back Lavatories.
Lavatory Traps, Brackets and Supply Pipes.
Bath Supplies, Solder, Nipples and a large variety of Plumbing Brass Goods.

GET OUR PRICES BEFORE PLACING YOUR ORDER.

THE HUMPHRYES MFG. CO.
MANSFIELD, OHIO
New York Office: 81-83 Fulton Street.

Drake Adjustable Burner

STYLE ONE

Self-Cleaning.
Adjustable
Aligment.

Price each 30 cents; per dozen $3.10 postpaid.
Manufactured by the
Drake Acetylene Apparatus Company, 38 Hathaway St. Cleveland, Ohio

HADESTY IMPROVED TAPPING MACHINE

For tapping water and gas mains against pressure. It leads them all. Sold on approval. Taps mains from 3 to 30 inches. No saddles required for different sized mains. Weight, complete, only 18 lbs. A boy 12 years old can make a connection in 15 minutes. Get prices from

J. M. HADESTY & SON
TAMAQUA, PA.

Domestic Engineering
The Leading Journal of its Class

Very Useful!

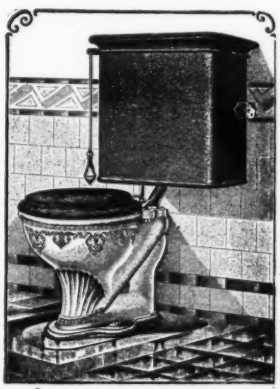
DOMESTIC ENGINEERING'S JOBBERS' LIST.

Now Ready. Price, $5.00.

A complete compendium of all legitimate Jobbers in Plumbing, Gas and Steamfitting Supplies in the United States; their address, line of goods carried and names of buyers. DOMESTIC ENGINEERING.

VIXEN

Solid Bent Wood Tank.
Seamless Fixtures.

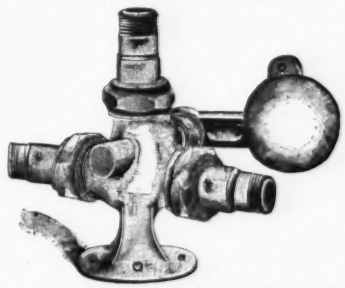


High Pressure Ball Cock.
No Solder Inside of Tank.

The National Supply Company
TOLEDO, OHIO

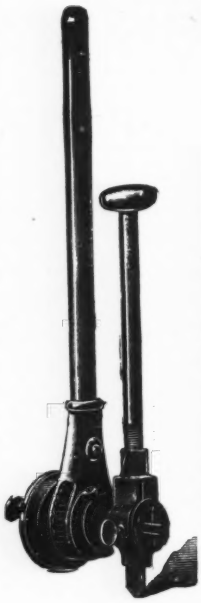
Star Hopper Valve

GET THE BEST, IT'S THE CHEAPEST



The above cut is an exact representation of the Star Hopper Valve, which we claim possesses more desirable points than any other Valve on the market. It wastes absolutely no water, the one straight stem setting firmly with solid ball on inlet end and hollow ball on waste end, is controlled by key stem or rock shaft to which the lever is attached. The action of this ball stem is in a straight horizontal movement and the fittings are so snug that rattling is impossible. The Valve closes with the pressure and is not affected by any variation in same. This hollow ball on the waste end of stem travels two-thirds of the stroke with the port closed, takes up any slack that might occur in seat chain, thereby preventing any waste of water passing through the soil pipe. The Star Hopper Valve was tested for two years by the Metropolitan Water Company, of Kansas City, Mo., and found to use no more water than a tank closed, it was then adapted and rated as a tank closed. The Star Hopper Valve is the most durable Valve on the market and will not require fifty cents for repairs in five years.

Crampton-Farley Brass Company
KANSAS CITY, MO.



The Climax Ratchet Stock

is an indispensable tool for conveniently threading iron pipe in ditches, under floors, in corners, overhead, etc. With this tool threads can be cut without removing whole lengths of pipe. This tool is provided with a strong vise which securely grips the pipe, and by means of the leading thread the die is forced on pipe and the thread is cut. It is made of malleable iron and steel, and, while light in weight, making it convenient to carry, is very strong and rigid. The advantages of this tool make it absolutely indispensable to Plumbers, Steam and Gas Pipe Fitters, Gas and Water Companies, Machinists, etc. It takes standard size dies, which are extra if furnished.

No. 1 threads ¼ to 1 inch pipe, takes die 2 and 2½ inches square.....$10.00

No. 2 threads 1 to 2 inch pipe, takes die 2½, 3 and 4 inches square $17.00

For sale by leading jobbers.

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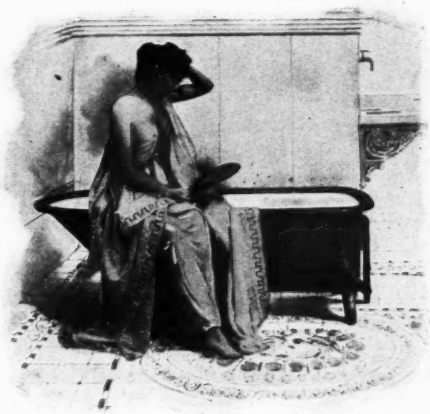
C. M. KEMP MFG. CO.

BALTIMORE.

WALKER'S *Enamelite* & *Steel Encased Copper Lined* TUBS.



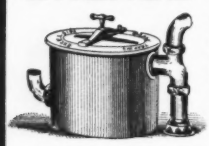
When your goods are marked with those stamps, you know you are getting the best. Our **Enamelite** tub is a delight to the eye and the **Steel Encased Copper Lined** of guaranteed full weight copper is the most durable on the market. Quality counts. The best is always the cheapest.

JAMES WALKER & SON.

43 Jefferson Ave., Detroit, Michigan.

EXCELSIOR

GREASE TRAP



Well and favorably known; two sizes for hotels and restaurants and residences. Get list price and trade discounts.

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GRAND RAPIDS, MICH.

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Blue Flame Cook Stoves.

"New Rochester"

WICKLESS SIMPLE SAFE

COOKING under these circumstances is a pleasure. The Rochester Lamp Co. stake their reputation on the stove in question. The best evidence of the satisfaction enjoyed is testimonials galore and duplicate orders from all parts of the world. Send for literature, both for the **"New Rochester" Cook Stove** and the **"New Rochester" Lamp.** You will never regret having introduced these goods into your household.

The Rochester Lamp Co.

38 Park Place and 33 Barclay St., New York

Sisson Insertable Joint

Indispensable to Plumbers

A friend in need is a friend indeed.

THE S. I. J.

FOR SOIL PIPE

Sizes 2 to 6 inches. Light and Heavy.

Makes a neat job and saves your patience.

ASK YOUR JOBBERS FOR IT

This does the trick.

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Made in 8 sizes, cutting pipe from ⅛ to 12 in. diam.

The "Genuine" bear this registered trade mark.

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The Victor Instantaneous Water Heater

is the cheapest, the most efficient and the neatest water heater made. It occupies but little space and is always ready, furnishing hot water in a few seconds, day or night.

The Victor received the highest award at the Omaha Exposition in 1898.
Write for descriptive circular, prices, discounts, etc.

W. J. ADAM....JOLIET, ILL.

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WIRE STRUNG TAGS A SPECIALTY

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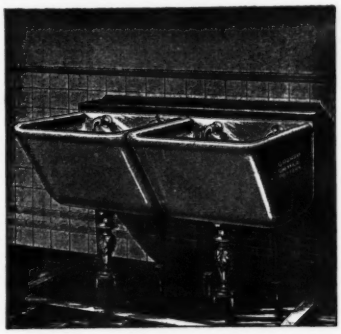

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Chas. Graham Chemical Pottery Works

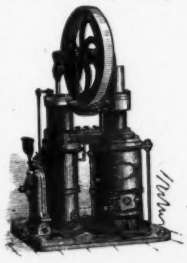
986-1018 Metropolitan Avenue, Brooklyn, New York.

DON'T BLAME THE PAPER

"I know the readers are there and that they have money to spend. When I fail to get results I know there is something wrong at my end of the line." :: :: :: :: :: :: :: ::

HOT AIR PUMPING ENGINES

There are only two good Hot Air Pumping Engines which have stood the test of time. They are the



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There is only one concern that has stood the test of time, and that is

The Rider-Ericsson Engine Co.

Every improvement suggested by our wide experience has been adopted.
Send for Catalogue "A" to nearest office.

RIDER-ERICSSON ENGINE CO.

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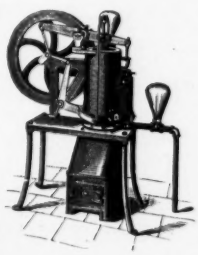
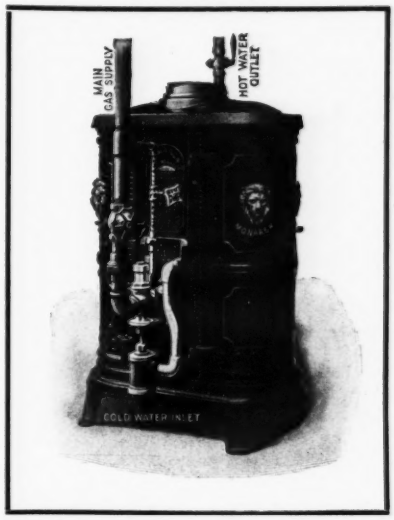


"MONARCH" LEADS



The "MONARCH" Automatic Instantaneous Water Heater, is the first and the best; in fact 'tis the "survival of the fittest".
Send for Catalog fully illustrated and you will be convinced.

MONARCH WATER HEATER CO.,
306 Wood St. Pittsburg
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Very Useful!

DOMESTIC ENGINEERING'S JOBBERS' LIST.
Price, $5.00.

A Plumber's Inventions for Plumbers

Bracket Rings
for Range Boilers, Give clear floor space.

Elevator Water Register
Prevents overcharge for water used on elevators.

Soil Pipe Testing Valve
Easiest applied; surest test.

Fresh Air Inlet Guard
Side opening; cannot stop up.

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Makes tight joint without breaking hubs. Saves loss.

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Reserve Foundry & Mfg. Co., Cleveland, Ohio.

Acetylene Gas Burners.

Drake Acetylene Burner Co., Cleveland, Ohio.
Williamson, R., & Co., Chicago, Ill.

Air Compressors.

I. X. L. Pump Co., Philadelphia, Pa.

Aluminum Solder.

Altpeter, L. F., Chicago, Ill.

Back Water Traps.

Barrett, Jas., Mfg. Co., Boston, Mass.
Duffy Mfg. Co., The, Chicago, Ill.
Martin, Emmett, Ft. Wayne, Ind.
Miller Specialty Co., N. Tonawanda, N. Y.

Ball Cocks.

Boston Brass Co., Boston, Mass.
Clark, Wm. E., Springfield, Mass.
Libby, Parker & Co., Boston, Mass.
Wolverine Brass Works, Grand Rapids, Mich.

Bath and Basin Waste.

Sanitary Co., The, Cleveland, O.
Weaver, The H. M., Co., Mansfield, O.

Baths, Porcelain Enameled.

Du Bois, F. N., & Co., New York City.
McShane, Henry, Mfg. Co., Baltimore, Md.
McVay & Walker, Braddock, Pa.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Weiskittel, A., & Son, Baltimore, Md.

Beer Coolers.

Seitz Beer Cooler Mfg. Co., Peoria, Ill.

Beer Pumps.

American Distributing Co., Syracuse, N. Y.
I. X. L. Pump Co., Philadelphia, Pa.

Boiler Couplings.

Detroit Sanitary Supply Co., Detroit, Mich.
Western Tube Co., Kewanee, Ill.

Brass Goods.

Boston Brass Co., Boston, Mass.
Bunting, Wm. Jr., Boston, Mass.
Crampton-Farley Brass Co., Kansas City, Mo.
Campbell, J. B., Brass Works, Erie, Pa.
Farnan Brass Works, Cleveland, O.
Glauber Brass Mfg. Co., Cleveland, O.
Hays Mfg. Co., Erie, Pa.
Humphryes Mfg. Co., Mansfield, O.
McDonald, A. Y., & Morrison Mfg. Co., Dubuque, Ia.
Peck Bros. Co., Chicago, Ill.
Powhatan Brass & Iron Works, Charlestown, W. Va.
Stebbins, E., Mfg. Co., Springfield, Mass.
Street & Kent Mfg. Co., Chicago, Ill.
Union Brass Works, Boston, Mass.
Zero Valve & Brass Mfg. Co., Buffalo, N. Y.

Brass Railing.

Columbus Brass Co., Columbus, O.

Brass Working Machinery.

Warner & Swasey Co., The, Cleveland, O.

Cellar Drainers.

Braender, Philip, New York City.
Kemp, C. M. Mfg. Co., Baltimore, Md.

Cement, Soil Pipe.

Desper, H. A., Worcester, Mass.

Chain Drills.

Duff Machine Co., Lowell, Mass.

Die Stocks.

Curtis & Curtis Co., The, Bridgeport, Conn.
Oster Mfg. Co., Cleveland, O.

Disc Wheels.

Buffalo Forge Co., Buffalo, N. Y.

Domestic Water Supplies.

Kirtley, Geo. P., & Co., Kansas City, Mo.

Drainage Fittings.

Jarecki Mfg. Co., Erie, Pa.

Drain Traps.

Libbey, Parker & Co., Boston, Mass.

Enamelite Baths.

Jas. Walker & Son Detroit, Mich.

Engravers.

American Process Engraving Co., Cincinnati, O.
Field & Beattie, New York City.
Standard Engraving Co., Philadelphia, Pa.

Expansion Tanks.

Oswego Boiler Works, Oswego, N. Y.

Feed Water Heaters and Purifiers.

Webster, Warren, & Co., Camden, N. J.

Ferrules.

American Distributing Co., Syracuse, N. Y.
Blatchford, E. W., & Co., Chicago, Ill.
Raymond Lead Co., Chicago, Ill.

Filters.

Champion Safety Lock Co., Cleveland, O.
Eclipse Filter Co., Philadelphia, Pa.
Lynn Filter Mfg. Co., The, Cincinnati, O.
New York Continental Jewell Filtration Co., New York City.
Scaife, Wm. B., & Sons, Pittsburg, Pa.

Fittings, Combination.

Illinois Malleable Iron Co., Chicago, Ill.

Fire Pots.

American Distributing Co., Syracuse, N. Y.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Schneider & Trenkamp Co., Cleveland, O.

Flushometer.

Kenney Co., The, New York City.

Floor and Ceiling Plates.

Codling Mfg. Co., Bristol, Conn.
Houghton & Buxton Co., Worcester, Mass.

Floats.

Naugatuck Mfg. Co., Naugatuck, Conn.

Flush Tanks.

Flush Tank Co., The, Aurora, Ill.

Flushing Valve Closets.

Ideal Mfg. Co., Detroit, Mich.
Peck Bros. Co., Chicago, Ill.

Foot Warmers.

Knapp, The Fred H., Co., Chicago, Ill.

Fresh Air Inlets.

Hart-Ayres Plumbing Co., Brooklyn, N. Y.

Furnaces, Warm Air.

Kelsey Furnace Co., Syracuse, N. Y.
Thatcher Furnace Co., New York City.

Gaskets.

United States Mineral Wool Co., New York City.

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Thackara Mfg. Co., Philadelphia, Pa.
United Metal Mfg. Co., New York City.
Williamson, R., & Co., Chicago, Ill.

Gas Heaters.

Central Supply Co., Columbus, O.

Gas Valves.

Akron Gas Valve Co., Akron, Ohio.

Graphite.

Dixon, Joseph, Crucible Co., Jersey City, N. J.
Wisconsin Graphite Co., Pittsburg, Pa.

Grease Traps.

Sproul & McGurrin, Grand Rapids, Mich.

Heaters, Steam and Hot Water.

Abendroth Bros., Port Chester, N. Y.
American Radiator Co., Chicago, Ill.

Barnard & Leas Mfg. Co., Moline, Ill.
Calorific Heater Co., Easton, Pa.
Columbia Heater Co., Chicago, Ill.
Griffing, A. A., Iron Co., Jersey City, N. J.
Herendeen Mfg. Co., The, Geneva, N. Y.
Ideal Heating Co., Oskaloosa, Ia.
Gorton & Lidgerwood Co., New York City.
Gurney Heater Mfg. Co., Boston, Mass.
Illinois Malleable Iron Co., Chicago, Ill.
International Heater Co., Utica, N. Y.
Kewanee Boiler Co., Kewanee, Ill.
Lord & Burnham, Irvington-on-Hudson, N. Y.
Magee Furnace Co., Boston, Mass.
McLain, The J. H., Co., Canton, O.
New York Central Iron Works Co., Geneva, N. Y.
Oswego Boiler Works, Oswego, N. Y.
Prizer-Painter Stove & Heater Co., The, Reading, Pa.
Roberts Machine Co., Collegeville, Pa.
Sheppard, Isaac A., & Co., Philadelphia, Pa.
Smith, H. B., Co., The, Westfield, Mass.
Smith & Thayer Co., Boston, Mass.
Stolz, Frank D., Chicago, Ill.
Thatcher Furnace Co., New York City.
United States Heater Co., Detroit, Mich.
Utica Heater Co., Utica, N. Y.
Vance Boiler Works, Geneva, N. Y.
Wilks, S., Mfg. Co., Chicago, Ill.

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Asbell, S. J., Co., Paterson, N. J.
Crampton-Farley Brass Co., Kansas City, Mo.
G. McG. Mfg. Co., Philadelphia, Pa.
Zero Valve & Brass Mfg. Co., Buffalo, N. Y.

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American Machine Co., Wilmington, Del.
Rider-Ericsson Engine Co., New York City.

Hose Reels.

Wirt & Knox Mfg. Co., Philadelphia, Pa.

Hydrants.

Kupferle, John C., St. Louis, Mo.

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American Self-Lighting Lamp Co., Peoria, Ill.
Chicago Solar Light Co., Chicago.
Search Light Mfg. Co., Chicago, Ill.
Welsbach Co., Gloucester, N. J.

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Cosmopolitan Incandescent Gas Light Co., Chicago, Ill.
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Vanderman Plumbing & Heating Co., The, Willimantic, Conn.

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Lausten Lead Works, Chicago, Ill.
Blatchford, E. W., & Co., Chicago, Ill.
Raymond Lead Co., Chicago, Ill.

Lead Traps.

Blatchford, E. W., & Co., Chicago, Ill.

Local Closet Vent.

W. J. Scully Ventilator Co., Detroit, Mich.

Mantle Chemicals.

Roessler Hasslacher Chemical Co., The, New York City.

Natural Gas Specialties.

Central Supply Co., Columbus, O.
Hollands Mfg. Co., Erie, Pa.

Oakum.

Planet Mills Mfg. Co., Brooklyn, N. Y.

Patents.

Dyer, Edmunds & Dyer, New York City.
Fitzgerald, W. T., & Co., Washington, D. C.
Frothingham, N. L., New York City.
Sugar, S. S., New York City.

Packing.

Jenkins Bros., New York City.

Patterns.

Balkwill Pattern Works, Cleveland, O.
Cope Pattern Works, Detroit, Mich.
Gobeille Pattern Co., Cleveland, O.
Olmstead, H. B., Co., New York City.

Pipe Benders.

Billings Pipe Bender Mfg. Co., The, New York City.

Pipe Coverings.

H. W. Johns Mfg. Co., New York City.
Keasbey, Robert A., New York City.
Norristown Covering Co., Norristown, Pa.
United States Mineral Wool Co., New York City.

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Barnes Tool Co., New Haven, Conn.
Trimont Mfg. Co., Roxbury, Mass.

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Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Curtis & Curtis Co., The, Bridgeport, Conn.
Hart Mfg. Co., Cleveland, O.
Hickman-Melhorn & Co., Pittsburg, Pa.
Jarecki Mfg. Co., Erie, Pa.
Oster Mfg. Co., Cleveland, O.

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Merrell Mfg. Co., Toledo, O.
Saunder's Sons, D., Yonkers, N. Y.

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Jarecki Mfg. Co., Erie, Pa.
Libbey, Parker & Co., Boston, Mass.
Penn Engineering Co., The, Philadelphia, Pa.

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Berger Bros., Co., Philadelphia, Pa.

Pipe, Lined.

Lamb & Ritchie, Cambridgeport, Mass.

Pipe Vises.

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Curtis & Curtis Co., The, Bridgeport, Conn.
Hollands Mfg. Co., Erie, Pa.
Parker, Chas., Co., Meriden, Conn.
Saunder's Sons, D., Yonkers, N. Y.
Trimont Mfg. Co., Roxbury, Mass.

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Simmons, John, Co., New York City.

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Atlas Pipe Wrench Co., New York City.
Trimont Mfg. Co., Roxbury, Mass.

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Noppel Pump Co., The, Hartford, Conn.
Perkes, Chas., Philadelphia, Pa.

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Knight, Thos. G., Brooklyn, N. Y.
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National Supply Co., The, Toledo, O.
Nelson, N. O., Mfg. Co., St. Louis, Mo.
Peck Bros. Co., Chicago, Ill.
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Robertson, The James, Mfg. Co., Baltimore, Md.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Sanitary Specialty Mfg. Co., Chicago, Ill.
Simmons, John, Co., New York City.
Stambach & Love, Philadelphia, Pa.
Wolff, L., Mfg. Co., Chicago, Ill.

Plumbers Woodwork.

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Parker Co., The, Chicago, Ill.

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Graham, Chas., Chemical Pottery Works, Brooklyn, N. Y.

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Merrie, Hugh, Cincinnati, O.

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Argon Mfg. Co., The, Denver, Col.
Chicago Air & Water Valve Co., Chicago, Ill.
Monash-Younker Co., Chicago, Ill.
Morgan & Co., Chicago, Ill.

Range Boilers.

Hayes Mfg. Co., Paterson, N. J.
Scaife, Wm. B., & Sons, Pittsburg, Pa.

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American Radiator Co., Chicago, Ill.
Fowler Radiator & Mfg. Co., Johnstown, Pa.
Gurney Heater Mfg. Co., Boston, Mass.
Holland Radiator Co., New York City.
Smith, H. B., Co., The, Westfield, Mass.
United States Radiator Co., Dunkirk, N. Y.

Radiator Shields.

Decatur Cornice and Roofing Works, Decatur, Ill
Twin Burner Vapor Stove Co., St. Louis, Mo.

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Frink, I. P., New York City.

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Kendrick Valve & Washer Co., Syracuse, N. Y.

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Bellmark Pottery Co., Trenton, N. J.
Maddock, Thos., & Sons, Trenton, N. J.
Sanitary Earthenware Specialty Co., The, Trenton, N. J.
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Standard Sanitary Pottery Co., Elizabeth, N. J.
Trenton Potteries Co., The, Trenton, N. J.
Universal Sanitary Mfg. Co., New Castle, Pa.

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Flush Tank Co., The, Aurora, Ill.

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American Mfg. Co., Battle Creek, Mich.

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Humphryes Mfg. Co., The, Mansfield, O.
McShane, Henry, Mfg. Co., Baltimore, Md.
Standard Sanitary Mfg. Co., Pittsburg, Pa.

Sinks, Wrought Steel.

Kilbourne & Jacobs Mfg. Co., The, Columbus, O.

Solder.

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Smooth-on Mfg. Co., Jersey City, N. J.

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National Supply Co., The, Toledo, O.
Nelson, N. O., Mfg. Co., St. Louis, Mo.
Rumsey, L. M., Mfg. Co., St. Louis, Mo.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Sanitary Specialty Mfg. Co., Chicago, Ill.
Simmons, John, Co., New York City.

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Walworth Mfg. Co., Boston, Mass.

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Jas. Walker & Sons, Detroit, Mich.

Stills.

Health & Comfort Supply Mfg. Co., Cincinnati, O.

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Armstrong Mfg. Co., The, Bridgeport, Conn.
Hart Mfg. Co., Cleveland, O.
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Rochester Lamp Co., New York City.

Street Washers.

Kupferle, John C., St. Louis, Mo.

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Ryan, Geo. F., & Co., Chicago, Ill.

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Davis, G. M., & Son, Palatka, Fla.

Tapping Machine.

Hadesty, J. M., & Son, Tamaqua, Pa.

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Desper, H. A., Worcester, Mass.

Temperature Regulators.

Electric Heat Regulator Co., Minneapolis, Minn.

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Cudell, F. E., Cleveland, O.
Detroit Sanitary Supply Co., Detroit, Mich.
Lausten Lead Works, Chicago, Ill.

Tubing.

Benedict & Burnham Mfg. Co., Waterbury, Conn.
Merchant & Co., Philadelphia, Pa.

Unions.

Dart, E. M., Mfg. Co., Providence, R. I.
Flagg, Stanley G., & Co., Philadelphia, Pa.

Valves.

Campbell, J. B., Brass Works, Erie, Pa.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Boston, Mass.
Hays Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., New York City.
Kinsey & Mahler Co., Peoria, Ill.
Sweet & Doyle, Cohoes, N. Y.

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Trane, Jas. A., Vacuum Heating Co., La Crosse, Wis.
Vapor Htg. Co., York, Pa.

Washers.

Bell, Andrew, Newark, N. J.

Water Closet Combinations.

Colwell Lead Co., New York City.
Dececo Co., The, Boston, Mass.
Fleck, Bros., Philadelphia, Pa.
National Supply Co., Toledo, O.
Nelson, N. O., Mfg. Co., St. Louis, Mo.
Parker Co., The, Chicago, Ill.

Water Heaters.

Adam, W. J. Joliet, Ill.
Hollands Mfg. Co., Erie, Pa.
Humphrey Mfg. & Plating Co., The, Kalamazoo, Mich.
Instantaneous Water Heating Co., The, Chicago, Ill.
Kewanee Boiler Co., Kewanee, Ill.
Lawson, L. S., Homestead, Pa.
Monarch Water Heater Co., Pittsburg, Pa.
Oswego Boiler Works, Oswego, N. Y.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Wilks, S., Mfg. Co., Chicago, Ill.

Water Lifts.

Cleveland Faucet Co., The, Cleveland, O.
Rhodes, L. E., Co., Hartford, Conn.

Water Meters.

Thomson Meter Co., Brooklyn, N. Y.

Water Registers.

Desper, H. A., Worcester, Mass.

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WE believe success—long continued, permanent success—can only be achieved in the newspaper business by conducting it in the same way a man builds a good reputation—it must have character back of it, and character, a strong character, must be based on honest intention. We all slip up in fulfillments, but good intent is necessary if good fulfillment ever comes. Our intent is to print the best trade journal in the world, in the best way, seeking for the best result. If you think we are falling short of the mark, in the interest of good results, please let us know.

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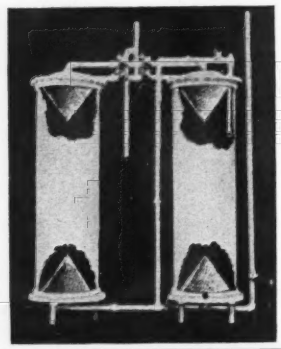

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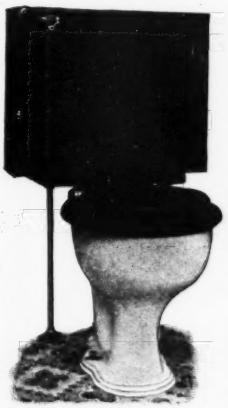

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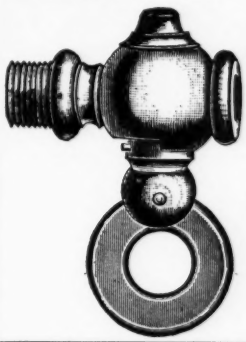

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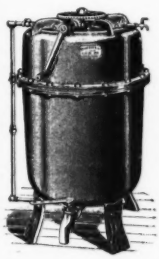

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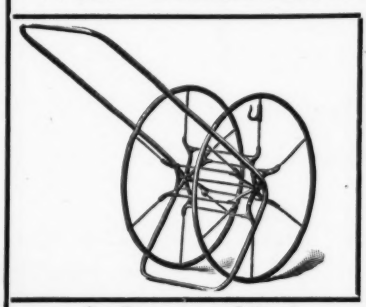

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We carry in stock ¾, 1, 1¼, 1½, 2, 2½ and 3 inch Benders.

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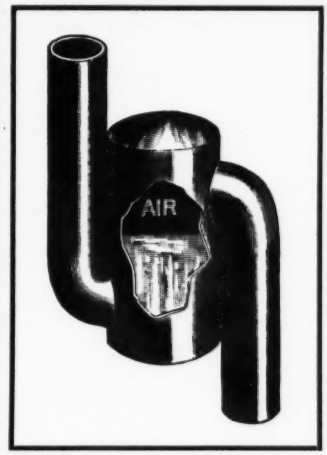
2. A directory of all legitimate jobbers of heating, engine and mill supplies in the United States, lists of goods carried and names of buyers.
3. A directory of all jobbers of plumbing, gas, steam, engine and mill supplies in Canada, with names of buyers.
4. A directory of every wholesale dealer of plumbing, heating and mill supplies in all foreign countries, officially furnished by United States consuls.
5. Alphabetical list of names and addresses of manufacturers of plumbing, gas, heating, engine, mining and mill supplies in the United States for ready use for reference or addressing.
6. A classified list of all the principal articles carried by jobbers of plumbing, gas, heating, engine, mining and mill supplies with names and addresses of manufacturers of such articles underneath each heading.

Domestic Engineering

58-64 North Jefferson Street, Chicago, Illinois



"Go Way, Way Back"

And look up the record of the Clean Sweep Traps. The words that express most eloquently their worth, are

POSITIVELY—THEY ARE THE BEST MADE.
COMPARATIVELY—NOTHING LIKE THEM.
SUPERLATIVELY—THE MOST SANITARY.

This is not egotistical hyperbole, but the calm and conservative opinions of Sanitary experts, plumbers and architects.

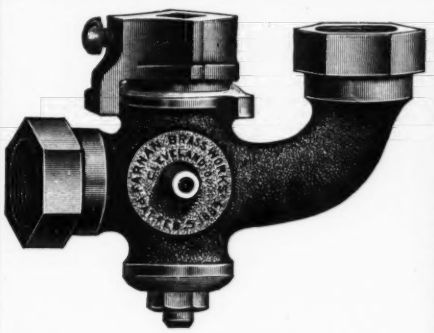
One Word More.

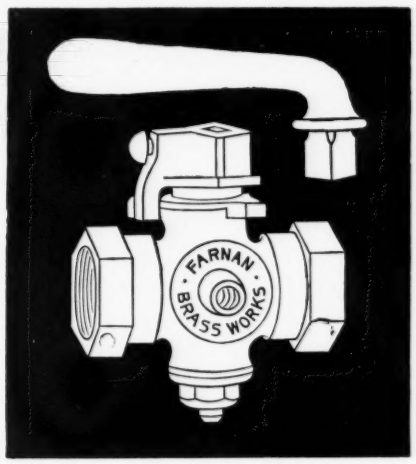
Clean Sweep Fuller Work is noiseless, has handsome appearance, excellent in finish. Ask your jobber for these goods, and you get them. The Traps are sold by every jobber in the United States, also in Germany, Norway, England and Canada.

Detroit Sanitary Supply Company

27 Jefferson Avenue DETROIT, MICH.

SOLE MANUFACTURERS





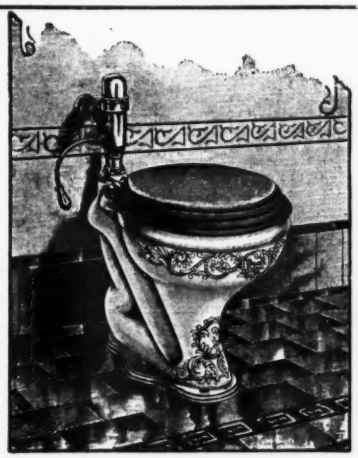
FARNAN BRASS WORKS

CLEVELAND, OHIO

ALL KINDS OF STOP COCKS

...INVERTED KEY STOP AND WASTE...

PIPE SCREWED ON TOP MAKES AN EXCELLENT ROD PROTECTION .....



PATENT APPLIED FOR

Fig. E. 99. ANGLO. Lever action.

IT WILL PAY YOU TO DROP US A LINE FOR OUR CIRCULARS AND PRICES OF

The Watrous

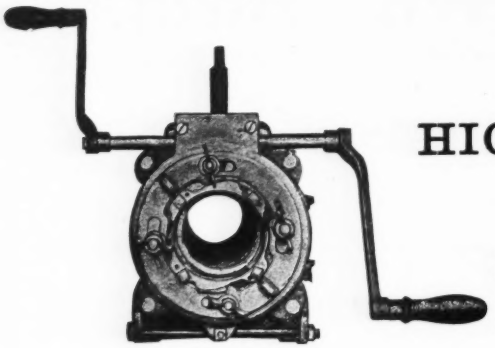
"AQUAMETER"

It is a self-measuring flush valve for water closets and urinals, automatically measuring the water for each flush. No more ball cocks, individual tanks or flush pipes needed, as it may be attached direct to pipe from city main or storage tank. Made in two styles, **lever action and seat action.** The WATROUS "AQUAMETER" is in use in many of the best buildings throughout the country, giving perfect satisfaction in all cases. We would be pleased to refer you to same on application. We use no cup washers in the construction of this valve. Manufactured and for sale by

Peck Brothers Company

231-237 Washington Street CHICAGO, ILL.

Combination Vise and Screw Cutting Machinery



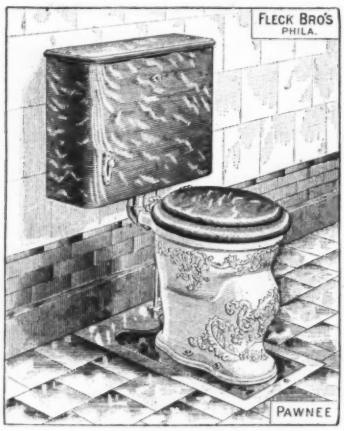
SAVES TIME AND MONEY
SEND FOR CATALOG AND PRICES

HICKMAN-MELHORN COMPANY

200-208 Liberty Avenue, PITTSBURG, PA.

SELLING AGENTS.

Strong, Carlisle & Hammond, Cleveland, Ohio.
National Supply Co., Toledo, Ohio.
A. Harvey's Sons Mfg. Co., Detroit, Mich.
James B. Clow & Son, Chicago, Ill.
The Robert Rom Co., Milwaukee, Wis.
M. M. Buck Mfg. Co., St. Louis, Mo.
Knight & Jillson, Indianapolis, Ind.
Ben. D. Potts, Columbus, Ohio.
The Law Co., New York, N. Y.
Cuyler & Mohler, Baltimore, Md.



"PAWNEE"

LOW DOWN SYPHON HOPPER

WITH JET

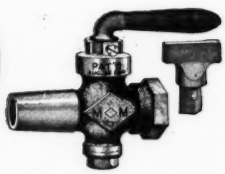
ROUGHS IN AT 12 INCHES

QUIET AND EFFECTIVE IN OPERATION. WRITE FOR PRICES.

WE CARRY A COMPLETE STOCK OF **LOW DOWNS.**

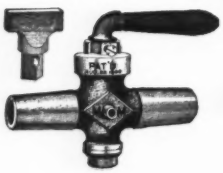
FLECK BROS., PHILADELPHIA, PA.

DIAMOND



PATENT GUARD WORK, AND A FULL LINE OF

PLUMBERS' BRASS WORK



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A. Y. McDONALD & MORRISON MFG. CO.

ESTABLISHED 1856

DUBUQUE, IOWA

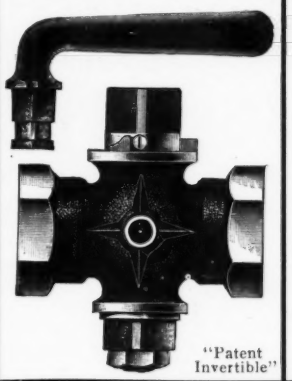
IF YOU HAVE ANYTHING

YOU WISH TO SHOW TO THE BUILDING TRADES, ARCHITECTS, OR THE PUBLIC, PLACE IT IN

Open every business day
8 A. M. to 5 P. M.
FREE
For particulars write the Superintendent.

THE BUILDERS' EXCHANGE
PERMANENT EXHIBITION

18 to 24 South 7th Street, Philadelphia, Pa.

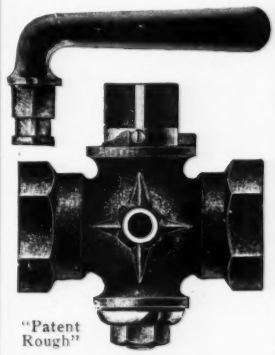

"Patent Invertible"

Here is a Stop and Waste Cock that may be used in any position.

WRITE FOR CATALOGUE.

J. B. CAMPBELL BRASS WORKS.

ERIE, PA.


"Patent Rough"

New Life in an Old Concern

We are successors to James Barrett & Son and shall continue manufacturing the

Barrett Specialties

Adding a line of new special goods. We are now prepared to quote on the

Original Barrett Special Fittings

No. 19 Gauge with Tools. Expense saved by using these fittings. Barrett's Tide Water Trap and Cleanout.

James Barrett Mfg. Company

48-50 Pearl Street, and
209-211 Franklin Street,
BOSTON, MASS.

Lausten Lead Works

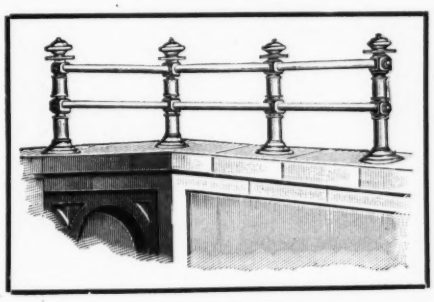
PRATT AND MORGAN STREETS

CHICAGO

Bi-metallic specialties
Lead traps and bends

Write for prices

Lead pipe, sheet lead
Ebony gloss plumbers' soil



BRASS RAILING

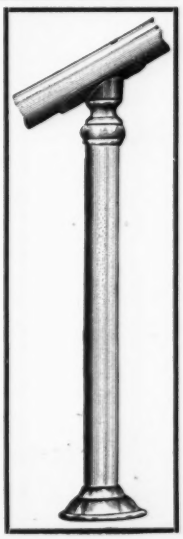
HAND RAILS BAR RAILS FOOT RAILS STAIR RAILS BANK RAILS STORE RAILS

ALL KIND OF RAILS

RAILS IN ANY FINISH

BRASS, BRONZE, OXIDIZED COPPER.

NICKEL, SILVER AND GOLD PLATED.



The Best Work and the Right Price.

The Columbus Brass Co., Long and Sixth Streets Columbus, Ohio.

ESTIMATES CHEERFULLY FURNISHED.

The Champion

Water Filters

ARE

Germ Proof and Give Perfect Satisfaction

MADE IN

FIVE STYLES AND FOURTEEN SIZES.

Secure a profitable Agency.

Catalogue and Prices upon application.

THE

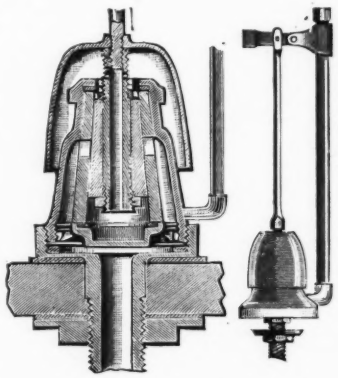
Champion Safety Lock Co.

95 Woodland Ave., Cleveland, Ohio, U.S.A.

THE CLARK AUTOMATIC VALVE OR BALL COCK

Self Closing

Tight Fitting



Noiseless in Operation

Positive in Action

Made on entirely new principles of construction, a ground plug and shell making a perfectly tight joint. Has no packings to wear out, hence is durable and economical.

Write for Circular and Price List.

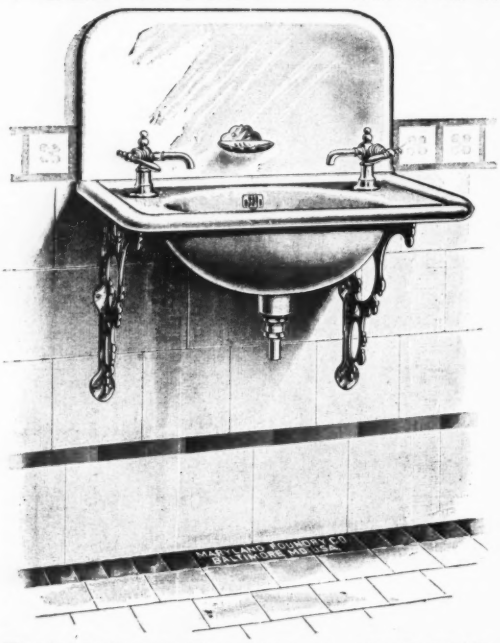
WILLIAM E. CLARK

INVENTOR AND MANUFACTURER

140 State Street, Springfield, Mass.

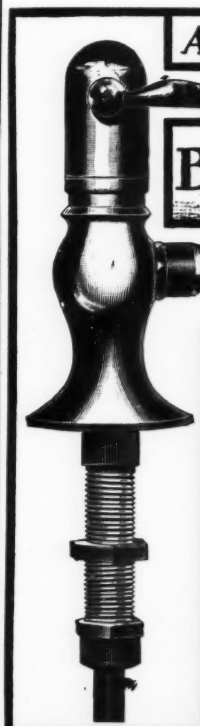
Weiskittel's

ENAMELED IRON LAVATORIES
FINEST IN THE WORLD



Write for catalogue of full line and discount. Manufactured by

A. Weiskittel & Son, Baltimore, Md.



All first class Plumbers are using the New Style

Broughton Self Closing Basin Cock

NO EXPOSED SURFACES, EASILY KEPT CLEAN

THE BROUGHTON SELF-CLOSING BIBBS & COCKS HAVE BEEN ON THE MARKET SEVERAL YEARS - SUPERIOR TO ALL OTHERS FOR SIMPLICITY AND STRENGTH - EVERY ONE WARRANTED.

Send for Circular and Price List

E. STEBBINS MFG. CO.
SPRINGFIELD MASS.

The NO-LEAK REGULATOR

GUARANTEED NOT TO STICK OR LEAK

MOST PERFECT VALVE MECHANISM FOR CONTROLLING FLUID PRESSURE.

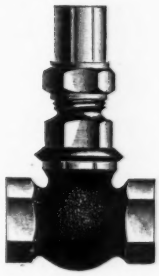
Patent Pending.

HughMerrie

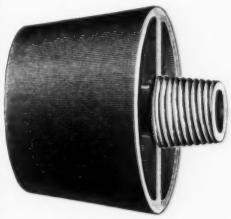
225 East Ninth St.,

Cincinnati, Ohio

HAYS



GAS GOODS



MIXERS
LOCK SHIELD VALVES
SQUARE STEM VALVES
WHEEL VALVES
FLOOR PLATES
SERVICE METER UNION METER } COCKS

We Solicit Your Orders, Great or Small.

HAYS MANUFACTURING CO.

ERIE, PA.

F. N. DU BOIS & COMPANY

HEADQUARTERS FOR

Lead Pipe,
Lead Traps
and Bends,
Drum Traps,
Combination Lead
Bends and
Lead Ferrules

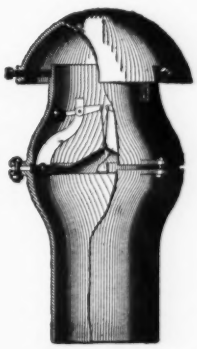
F. N. DU BOIS & COMPANY

245 Ninth Ave., cor. 25th St., New York City

The Ayres..... Fresh Air Inlet

PATENTED

Adopted by the Department of Buildings of Greater New York



For Sale by Dealers in Plumbing Supplies only

MANUFACTURED BY

The Hart=Ayres Plumbing Co.

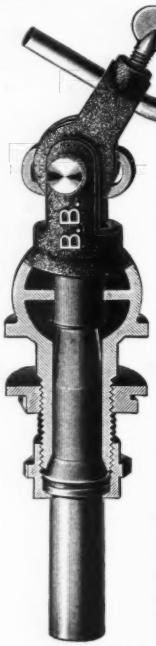
MANUFACTURERS OF PLUMBING SPECIALTIES

Fourth Avenue and Degraw Street,
BROOKLYN, N. Y.

THE B. B. HIGH-PRESSURE BALL COCK

THE SIMPLEST AND BEST COCK EVER MADE

No special packing required. Ground joint coupling which is always tight. Roller bearing lever on cam, reducing friction to lowest amount. No hammering, no singing or whistling. Has only one packing which is easily removed. Removable seat of best steam metal. We are making Floats stamped with our B. B. which are thoroughly guaranteed. Ask your jobbers for them.

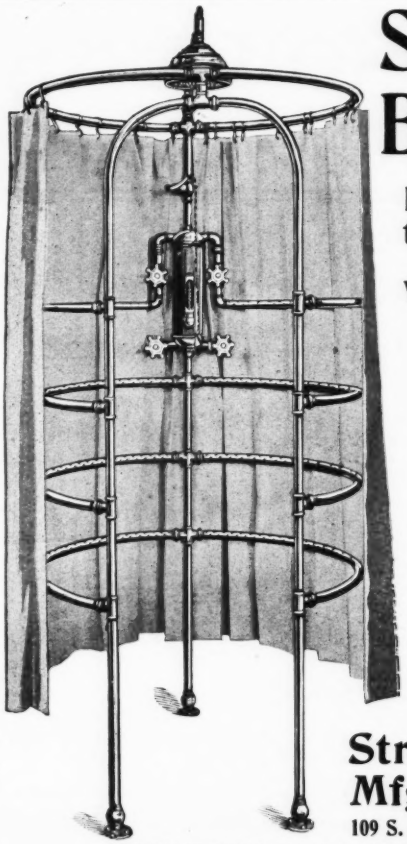


All sizes ½ to 3 inches inclusive

Removable Seat.

Made for Top. Bottom and End Supply.

Boston Brass Co., 36 & 38 Oliver St., **Boston, Mass.**



Shower Baths

Do we make them?

Well, we guess yes.

and any kind you may want, at prices that will interest you.

Catalogue for the asking.

Estimates cheerfully furnished on any special designs wanted.

Street & Kent Mfg. Co.

109 S. Jefferson St., CHICAGO

HENRY STEIN, Representative, 48 Cliff St., New York

Utility Ratchet Chain Drill

Not every man can afford to have every tool offered him. He must discriminate, and choose those which will do the most work. Designed to do heavy work, such as structural iron work, pipes, columns, etc.

Operates either by ratchet or continuous rotary movement of handle.

Frame is made with notches, in which chains may be engaged at any point. Ball thrust bearing reduces friction. Polished parts are nickeled.

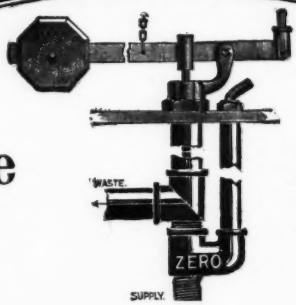
Weight 6½ lbs.; takes ½ inch shank of drill or larger.

We have other good tools, too. Write for Circulars.

DUFF MACHINE CO.

595 Middlesex St., LOWELL, MASS.

WILL NOT FREEZE



Save Half the expense of installing closets by getting

Zero Anti-Freezing Valves

They can be put in with half the time and half the labor because they do not require a pit or vault. They are simple and durable in construction—made without screws, springs or pins.

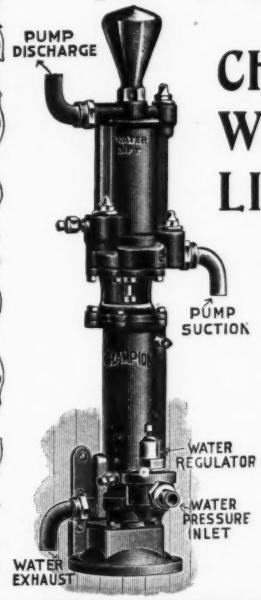
ZERO VALVE AND BRASS MFG. CO.
BUFFALO, N.Y.

THE CHAMPION WATER LIFT

IT PAYS

TO PUT IN THE

CHAMPION WATER LIFT



For pumping cistern water or for increasing city pressure it is the BEST.
IT WORKS PERFECTLY.
That is our guarantee, and our name is guarantee that the construction is right. Handled by all large jobbers. Write for catalog.

MADE ONLY BY

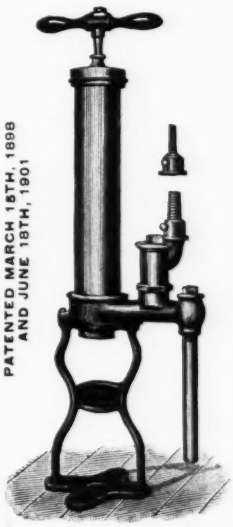
THE CLEVELAND FAUCET COMPANY

CLEVELAND:
15-27 Frankfort Street.
NEW YORK:
4 Great Jones Street.
CHICAGO:
92 Franklin Street.
SAN FRANCISCO:
202 Ellis Street.

THE CHAMPION WATER LIFT

INTELLIGENT ECONOMY

forbids the purchase of three pumps when you can get ONE that will do the work of three.



THE PERKES

COMBINATION AIR, FORCE AND TEST PUMP

can be used for testing soil pipe, proving gas pipe, and is the best force pump on the market.

No stuffing boxes; all valves are on the outside, and work equally well with air or water.

Send for Complete, Descriptive Circular.

MANUFACTURED BY

CHARLES PERKES

ESTABLISHED 1856

627-629 Arch Street, Philadelphia

THE MOST PERFECT PROTECTIVE COATING

FOR { GAS / WATER / STEAM

Or other pipe fittings, guaranteeing the threads from corrosion and destruction by frequent dissection is

WISCONSIN GRAPHITE PIPE-JOINT PASTE

It prevents leaks, the admission or emission of air, is not affected by moisture, alkali's, acids or intensities of temperature.

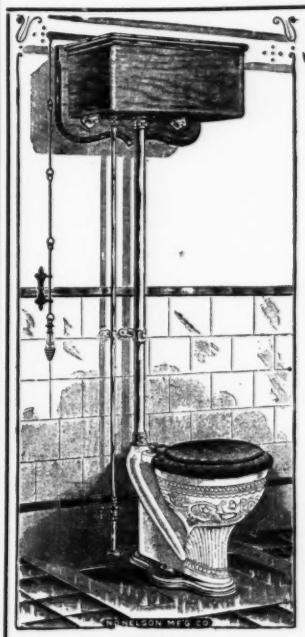
Pipe systems covered with Graphite Paint, and joints sealed with the Graphite Paste, defy wind and weather, heat or cold, wet or dry.

Address Dept. C,

Wisconsin Graphite Co.

Send for sample and price list.

North Side, Pittsburg, Pa.



Nelson's High Grade Syphon Jets.

The New "Dominion"

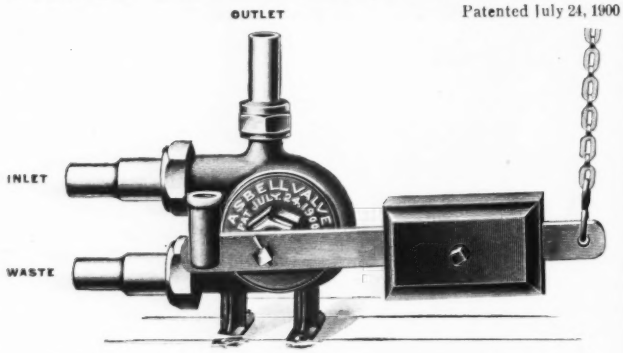
Double Jet
Polished Wood Work
Mechanically Perfect
Absolutely Guaranteed

N. O. Nelson Mfg. Co.

...PLUMBERS' SUPPLIES...

ST. LOUIS, MO.

ASBELL'S
FROST PROOF HOPPER VALVE



Made of best brass, has no pins or screws to work loose, or spring to get weak and break; most durable and most compact valve on the market; can be operated by chain or iron rod with seat; closes with the water pressure—when closed there is no pressure on the stuffing box—an adjustable weight regulating it to suit the amount of pressure. The only washers used on inlet and waste are two fuller balls, the top of which governs the supply and the bottom the waste; when in operation the waste is perfectly tight, so as to give closet full flow of water. From the cut it will be seen that the valve is so constructed and arranged that not a particle of water will remain in the valve casing after the flushing of the closet, having a waste the same size as the supply, therefore making it quick wasting and *frost proof*. They are made for lead pipe, and ½ inch iron pipe without extra charge. Also for ¾ inch iron pipe for after flush closets, where air compressed tanks are used. If the latter is desired so state, and add 50 cents to the list.

The S. J. Asbell Company, Paterson, N. J.

WE ARE NOW MAKING
Enameled
Iron Baths

Also Sinks and Lavatories

Send for Catalogue E.

Henry McShane Mfg. Co.

BALTIMORE, MD.

The Standard Sanitary Pottery Company

Works: 1122 Elizabeth Ave., Elizabeth, N.J.

MANUFACTURERS OF

Vitrified Bone China

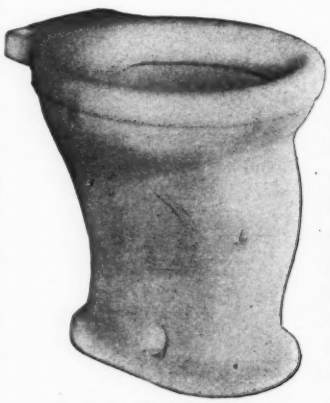
Sanitary Specialties

We beg to call your attention to our High Grade Sanitary Earthenware, manufactured from Vitrified Bone China. Employing none but experienced and competent workmen, we are in position to manufacture all classes of Sanitary Specialties, and we solicit correspondence from those in the trade having anything in this line which they desire made.

The Standard Sanitary Pottery Co.

Elizabeth, N. J.

To the Plumbing Supply Trade:



No. 1. Plain Washdown

This cut represents our new improved plain wash down, which is made with walls one inch thick insuring unusual strength, thereby reducing liability of breakage to a minimum; it is therefore particularly adapted for public buildings, schools or any public place where closets are subjected to hard usage, and is designed to take the place of imported or domestic fire clay closets, and being constructed of a hard vitreous china body it is guaranteed against crazing. We can also furnish these closets with syphonic action or syphon jet.

We manufacture everything in the sanitary earthenware line and pay particular attention to specialties. All closets being tested before leaving our works, we guarantee their working qualities.

Bellmark Pottery Co.

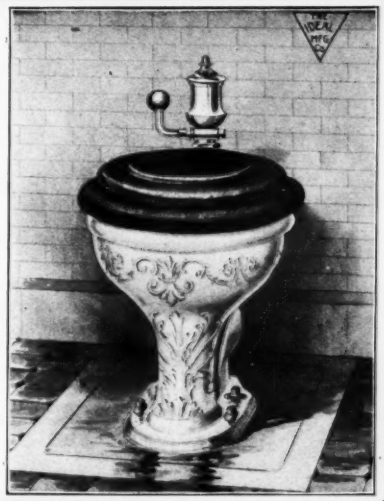
P. O. Box 547. TRENTON, N. J.

THAT

IS THE ONLY PRESSURE REGULATING FLUSH VALVE ON THE MARKET. FLUSHING THE CLOSET WITH THE SAME AMOUNT OF WATER AT EACH OPERATION REGARDLESS OF FLUCTUATIONS IN PRESSURE AT THE MAIN OR SUPPLY WITHOUT ANY ADJUSTMENTS.

Perfectly Automatic Patented

The IDEAL Volumeter



THE IDEAL MFG. CO. DETROIT MICH.

The IDEAL Mfg. Co.

Manufacturers of

Fine Sanitary Specialties

DETROIT MICH.

GREENLEAF

THE IDEAL MFG. CO. DETROIT MICH.

THE AMERIGAN PROGESS ENGRAVING GOMPANY

MAKERS
OF
FINE
CATALOGUE
ILLUSTRATIONS

15 to 17 WEST SIXTH STREET, CINCINNATI, OHIO, U. S. A.

Willing Workers——

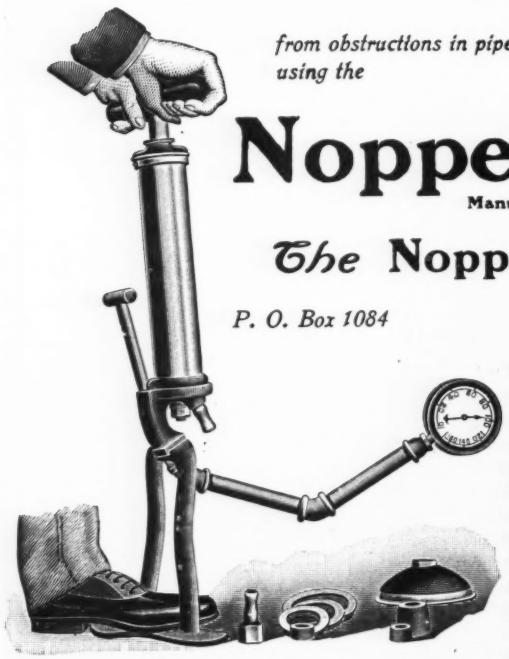
that's the kind. Work 365 days in the year—no holidays; no strikes; no "off" days. There are no more reliable closets than the Trenton Potteries Company's. Their working qualities are guaranteed. : : : : : : : : : : :

The closet here illustrated is as fine a working fixture as was ever turned out of any pottery. Has 3-inch seal against sewer gas. Extra large water surface in bowl. Large openings through traps. Roughs in 8¾ inches to end of tail piece, or 12 inches with lowdown tank. 1¼ inch supply for high tank; 2 in. for low tank. Positive action.

SYPHON ACTION HOPPER AND TRAP.
No. 21 (Fig. 307 B).

THE TRENTON POTTERIES CO., TRENTON, N. J.

No More Trouble



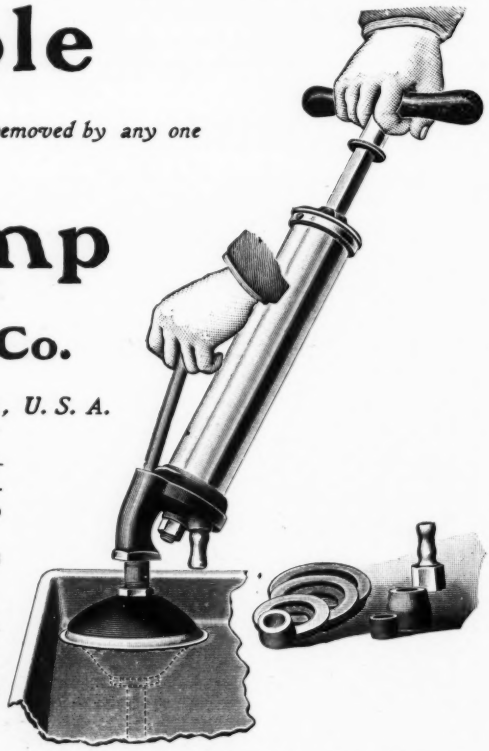
from obstructions in pipes. They can be easily removed by any one using the

Noppel Pump

Manufactured by

The Noppel Pump Co.

P. O. Box 1084 *HARTFORD, CONN., U. S. A.*



This pump is a Combination Lift, Force, Discharge and Test Pump and you can not only force air, liquid or gas into pipes, but can continue to do so, getting an ever increasing pressure. With no alteration in fittings or position of pump you can instantly change from force to suction and continue to exhaust air or draw out and discharge water and loose material. **No Other Pump has these Advantages.**

SEND FOR CIRCULAR

INDESTRUCTIBLE **SIMPLE IN CONSTRUCTION** **EASILY OPERATED**

Our New "Excelsior" Waste and Basin

PATENT APPLIED FOR

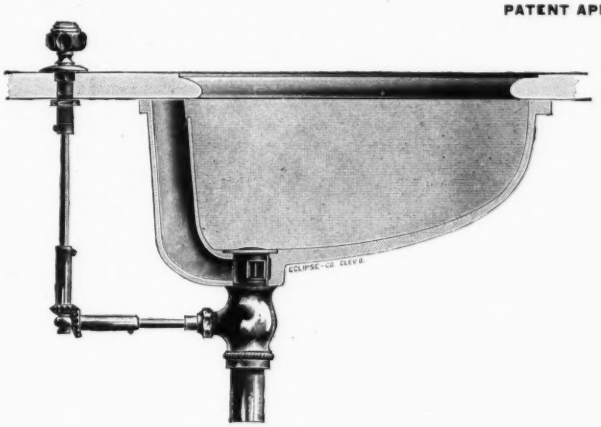


Fig. E 501.

We make the above Waste to fit the P. O. Bowls also.

THE MOST SANITARY COMBINATION ON THE MARKET.

This Waste cannot get out of order as will be readily seen. **We guarantee them in every respect.**

The Basin is the only one that can be cleaned **without removing a brass strainer.**

This Basin has no strainer, still only the dirty water can pass into the overflow, which is made in such a manner as to make it easily accessible Our new Catalog E tells you all. Have you one?

THE SANITARY COMPANY
CLEVELAND, OHIO

Do You Sell Instantaneous Water Heaters? Then

GET IN LINE

TO PUSH THE

Humphrey Crescent Instantaneous Water Heaters

LIST PRICE

No. 8 **$20.00**

including Shelf and Bracket.
Every Heater Guaranteed.
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The Humphrey Mfg. & Plating Co.

KALAMAZOO, MICH., U. S. A.

This is our No. 8 Crescent Heater.

BEATS EVERYTHING ON THE MARKET AT ANYWHERE NEAR THE PRICE.

THE BEST ON EARTH.

Crowned with Victory

The winning of the First Prize—a Gold Medal—at the Pan-American Exposition on Sanitary Vitreous China and Solid Porcelainware adds another laurel to the many already bestowed upon the world-famous products of the six great potteries owned and operated by this company.

The supremacy of the Trenton Potteries Company's sanitary fixtures and decorative ware was recognized in a like manner at the Paris Exposition—in competition with the nations of the earth—at the Philadelphia Export Exposition and at the Omaha Trans-Mississippi Exposition. At each of these the Trenton Potteries Company was given **highest award.**

But better than all these marks of distinction is the recognition by "the trade" and by the public generally of the high merit of these products, and the resultant growth in the demand therefor. More and more are recognizing the fact that the Trenton Potteries Company's wares are unsurpassed in appearance and in quality and as regards durability.

The Trenton Potteries Company is the largest manufacturer of Sanitary Earthenware in the world. Makes more Syphon Jets than all others combined. Manufactures finest grades of Genuine Vitrified China, and the celebrated Ideal Bath and Laundry Tubs, Sinks, etc. Every piece guaranteed against crazing—and no string attached to the guarantee. Ask your supply house.

The Trenton Potteries Co.

Trenton, N. J.

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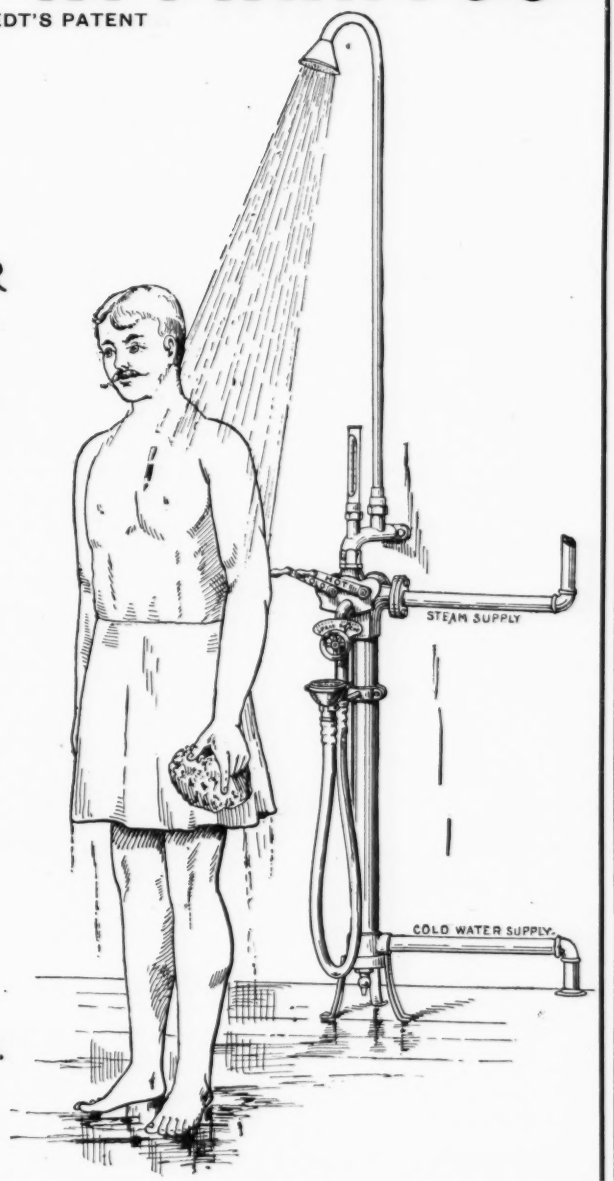
HOT WATER APPARATUS

SCHAFFSTAEDT'S PATENT

FOR THE INSTANTANEOUS
PRODUCTION OF

WARM OR HOT WATER

BY MEANS OF STEAM.



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PEOPLE'S BATH ESTABLISHMENTS.

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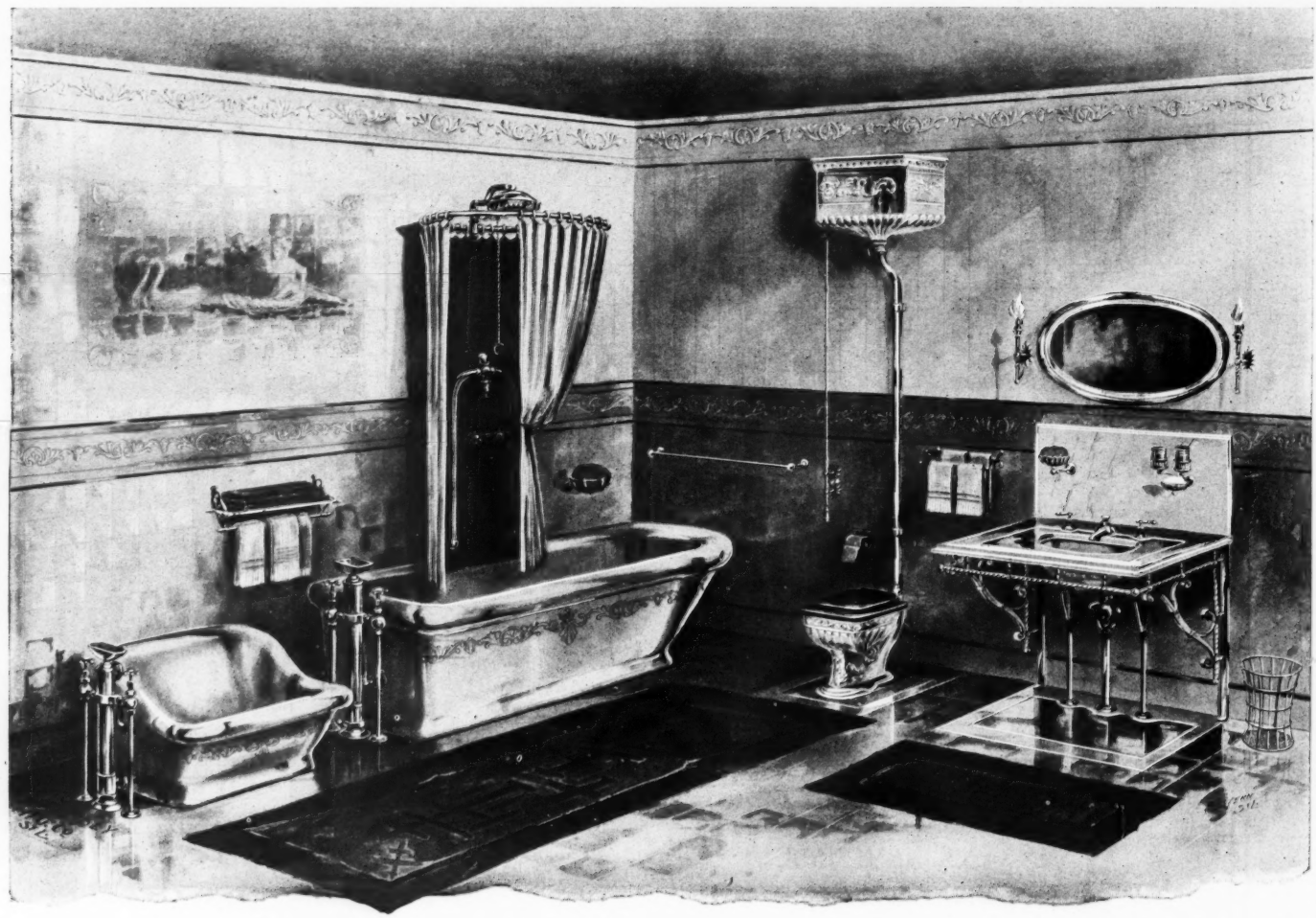
RUMSEY'S "UNA-SEAL"

BATH ROOM COMBINATION, COMPRISING



BATH.—"Una-Seal" Solid Porcelain Roll Rim Bath Tub, 5½ feet long, Class "A," with Porcelain Base to the floor, glazed inside and over Rim, exterior finished Zinc White with "Una-Seal" Decoration, Nickel-plated Low Bell Supply Fitting with Supply Pipes and "Superior' Waste, Nickel-Plated Combination Needle and Shower Bath with Rubber Lined White Curtain.

WATER CLOSET.—Square Embossed "Una-Seal" Syphon Jet Closet (Vitreous Ware) with Mahogany Seat and Cover, No. 25 Embossed Porcelain Syphon Tank, Nickel-Plated Flush and Supply Pipes, Nickel-Plated Rod and Pull Guide and Porcelain Pull. Decoration on Closet and Tank.

LAVATORY.—Italian Marble Lavatory, 34x24 inches with 16-inch Back, 14x19 D-shape Basin, Nickel-Plated "Olympian" Combination Supply and Waste Fixture, Nickel-Plated Supply Pipes, Trap and Ornamental Bracket, Nickel-Plated Soap, Tumbler, Brush and Sponge Holders, and 22x32-inch Plate Glass Mirror with Nickel-Plated Brass Frame.

SITZ BATH.—Solid Porcelain Roll Rim Sitz Bath, Class "A," with Porcelain Base to floor, glazed white inside and outside, with "Una-Seal" Decoration, Bell Supply Fitting with Brass Supply Pipes and "Superior" Waste.

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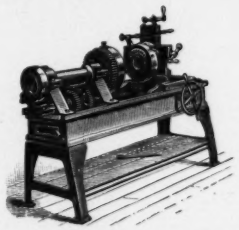

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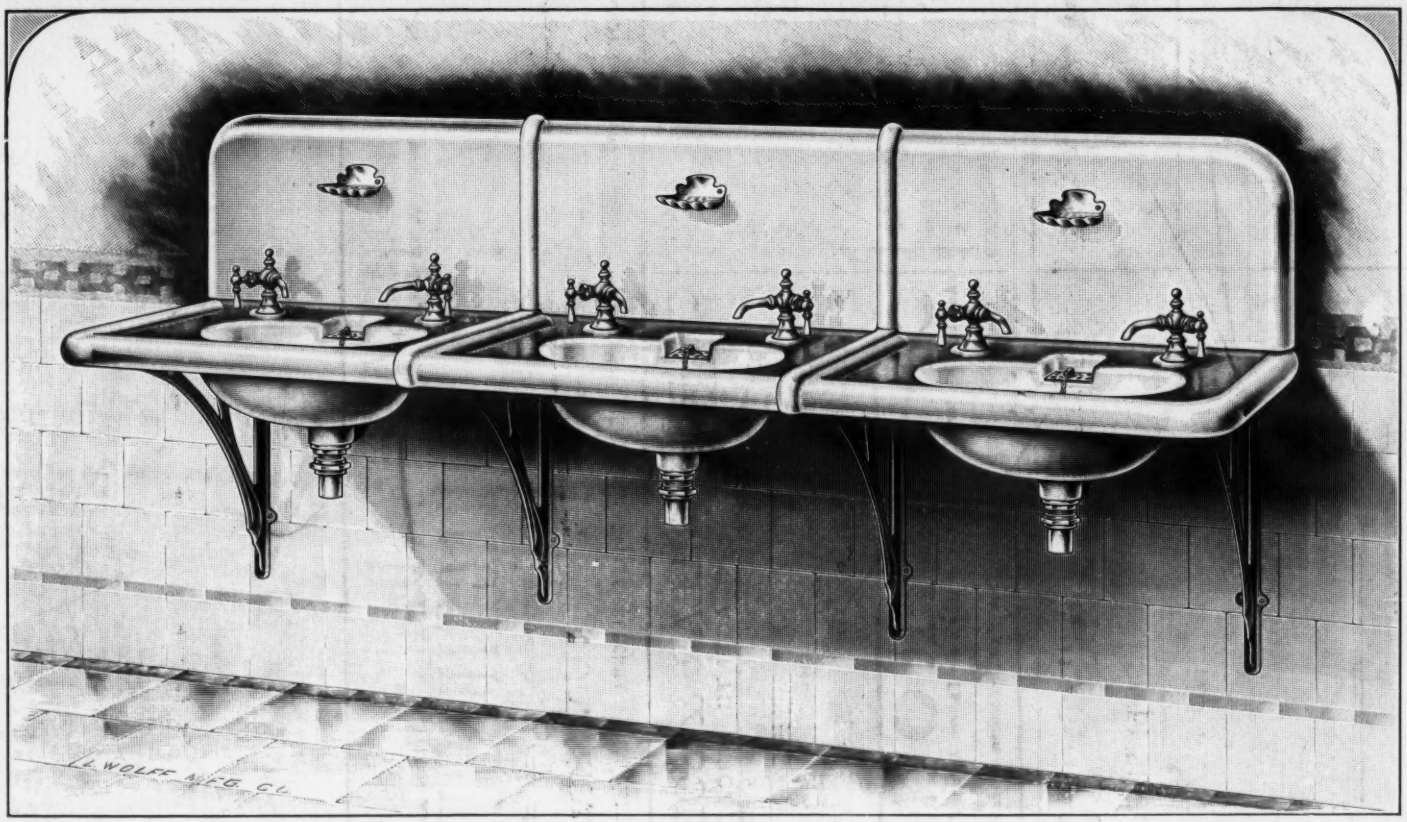

The above illustration shows the latest addition to our line of Enameled Iron Sectional Lavatories. Each section is 18 x 24 inches in size, having a straight back, D shape bowl, with extra large overflow fitted with N. P. brass strainer bolted to same. The roll rim on this Lavatory is extra large in size and curves under, giving same a very handsome effect. All joints are fitted with large lap where sections are joined together. The back is made with lower edge overlapping the back flange of slab, preventing any chance of water leaking through. N. P. Soap Cups are bolted to backs. Can be furnished with Right or Left hand end backs if so desired and also furnished with legs instead of brackets. We manufacture a complete line of Enameled Iron Lavatories of which samples are on exhibit at our Show Rooms, 91 Dearborn Street, Chicago.

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